

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVE

JANUARY 1991

VOLUME FOUR NUMBER FOUR

SEVEN DOLLARS

COVER STORY:

A Brave New World For Tomorrow's CIOs

Our Annual Study On Today's CIOs

AN INTERNATIONAL DATA GROUP PUBLICATION

Air Products and Chemicals Inc.'s Peter Mather





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CIO

VOLUME 4, NUMBER 4



Future perfect 44
Cover photo by Eugene Mopsik

COVER STORY

The Once and Future CIO

44

The CIO job description of tomorrow looks like déjà vu all over again. Except that in the future, more CIOs will fill the bill more capably, in a climate of wider acceptance of their strategic role.

By Thomas Kiely

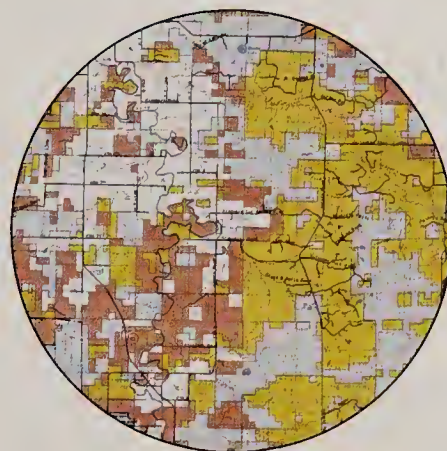
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The Forest for the Trees

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What do trees and information systems have in common? At Boise Cascade, almost everything.

By David Freedman



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timber management 24*

Are We There Yet?

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Our second annual survey of non-IS senior executives reveals that significant obstacles are slowing the CIO's journey to full strategic partnership. There is still a seat at the table, but getting to it may require a new approach. *By David Freedman*



On the rise 34

M O R E ► ► ►



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When the future comes knocking, only one PBX has both the flexible architecture and power to answer the challenge. The Fujitsu F9600.[™] Unlike others who've retrofitted older PBXs, the F9600 was designed from the start to take advantage of emerging telecommunication services—like ISDN and broadband. For starters, its distributed processor architecture lets you add capacity and functionality simply by adding processor modules. Its single stage switching matrix provides smooth growth and fast processing of voice, data and, when you need it, broadband services such as video. And thanks to its high-level applications-oriented software, new applications can be added as quickly as your needs change. Today, the system is performing worldwide in over 1,300 installations. Which shouldn't come as a surprise, considering Fujitsu Ltd. is a pioneer in ISDN technology and an \$18 billion global leader in computers and telecommunications. To see just how much better the F9600 really is, call Fujitsu Business Communication Systems at 1-800-654-0715. You'll find that with the F9600, the future's nothing to be afraid of.

FUJITSU

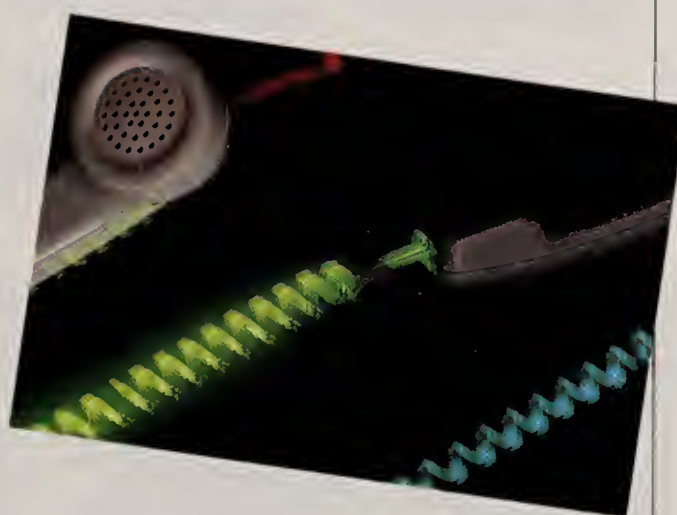
**FUJITSU BUSINESS
COMMUNICATION SYSTEMS**

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Getting a Line on Telemarketing

Automated telemarketing services are helping companies reduce sales costs, heighten productivity and foster customer goodwill. *By Leslie Goff*

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INSIGHTS: WHO'S THE EXPERT?

Expert systems don't run by themselves. Somebody must install them, tune them, maintain them—and decide who'll be held accountable for the actions they trigger. *By David Blanchard*

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STATE OF THE ART: OPEN WINDOWS FOR EIS

The slick graphical interface of the new Windows version plus its ability to unify multiple data sources add up to good news for EIS vendors and users. *By David Friend*

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HUMAN FACTORS: I.S. GETS A PHYSICAL

You can't say your IS function is in tip-top shape until you've given it a thorough checkup. *By N. Dean Meyer*

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The IEF™ can help you develop unprecedented quality, prod



"The IEF is a superior tool for implementing Information Engineering because it integrates the entire process from planning through code generation. We're deploying the IEF throughout the corporation."

David V. Evans
Vice President
Director, Information Systems
J.C. Penney



"Our On-line Banking system has been in production for more than 12 months—500,000 transactions a day—without a single code failure. And we had very few enhancements to do. Our users got what they needed the first time out."

Mark Quinlan
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Huntington National Bank



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"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

Paul R. Hessinger
Chief Technology Officer
Computer Task Group



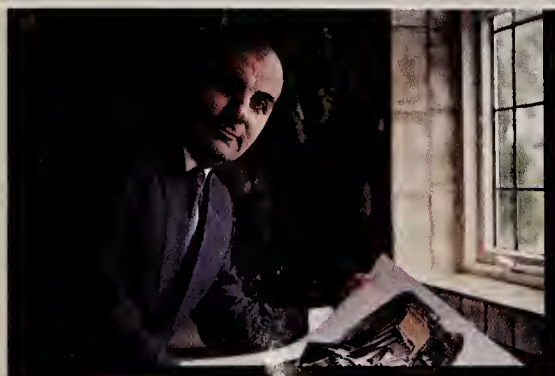
"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

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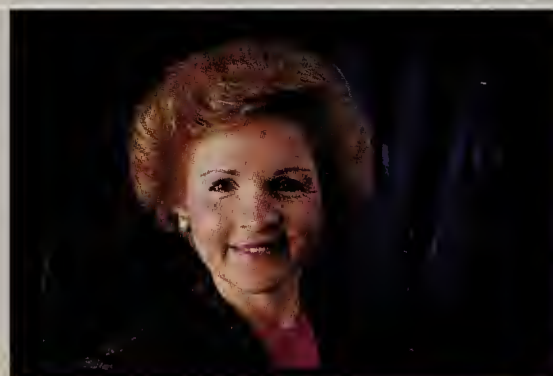
"Our users were extremely pleased when we finished our first project—a 60-transaction system—in one-half the budgeted time. We had tried interfaced CASE tools without success. IEF integration makes the difference."

Giorgio Sorani
Division Head - MIS
Lubrizol



"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development."

Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce



"We used the IEF to rebuild our aging Frequent Flight Bonus system. With DB2 tables of up to 52 million rows, we needed high performance. And we got it...98% of our transactions complete in less than 3 seconds."

Cloene Goldsborough
Director of Data Resource Management
TWA



"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

Open information systems with productivity and maintainability.

The success of Texas Instruments CASE product is proven—in the field.

Major companies have used TI's CASE product, the Information Engineering Facility™ (IEF™), for everything from rebuilding aging high-maintenance-cost systems to development of new enterprise-wide strategic systems.

Study shows zero code defects.

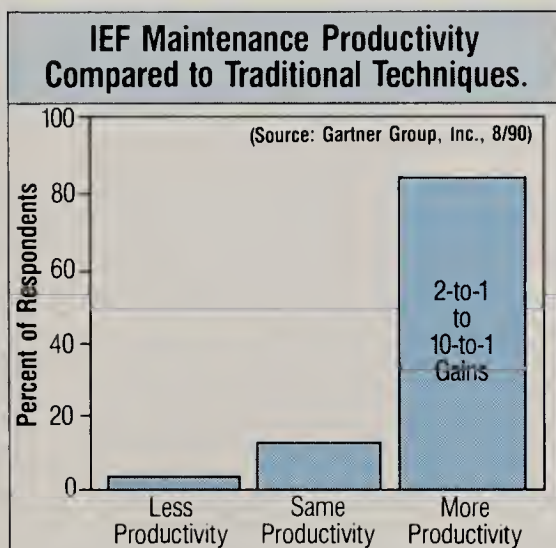
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that all IEF users who reported making application changes made all changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

Mainframe applications can be developed and tested on a PC.

With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

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follow. We are committed to increased environmental independence in support of the Open Systems concept.

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Or write Texas Instruments, 6550 Chase Oaks Blvd., Plano, Texas 75023.

TEXAS 
INSTRUMENTS



Learning what top management thinks about information systems and information executives has consistently proven to be of major interest to CIOs. Last year we laid the groundwork for probing those attitudes by teaming up with the consulting arm of Coopers & Lybrand to interview 200 top corporate executives. We reported the results of that survey in last January's issue ("Good News, Bad News . . .").

Intrigued by the results of that extensive survey, we repeated the project. Our follow-up survey, "Are We There Yet?" (Page 30), reported by Contributing Writer David Freedman, raises a slew of thought-provoking issues.

The Coopers & Lybrand consulting team noted in particular that the role of the CIO is gaining much wider acceptance. Only 12 percent of the top executives queried thought a credibility gap prevented CIOs from attaining success. (Interestingly, some 73 percent of CIOs interviewed in another C&L survey felt they did suffer from a credibility gap. It looks like CIOs are being too hard on themselves.) On the other hand, despite a generally positive view of CIOs, top management appears to be reluctant to invite the information executive into the elite strategy-setting inner sanctum.

The survey also pointed to a growing alliance between the CIO and the chief operating officer. The C&L consultants viewed this development as an important trend for the decade. Whereas the CFO has been interested in owning IT as a power base, the COO needs technology and the CIO's expertise to help operate the business and re-engineer business processes.

As a companion piece to the survey, Senior Writer Tom Kiely interviewed several CIOs on how they saw the future of their positions. He posed the same question to a number of well-respected information management gurus such as Harvard Business School Professor F. Warren McFarlan, who is confident that future CIOs will have substantial general-management experience gleaned not from staff jobs but from managing organizational units where "you bleed." And author Tom Peters described the successful CIO of the future as someone with a bold and wacky idea; someone who is a leader.

Speaking of Tom Peters, last month he wrote a syndicated column about magazines that people may not have heard of but should definitely read. *CIO* magazine was on Peters' recommended reading list. The idea that information management pervades the business atmosphere today and goes well beyond IS departments is a primary position of *CIO*. We are heartened to see this view being spread by people like Tom Peters.

Marcia Blumenthal



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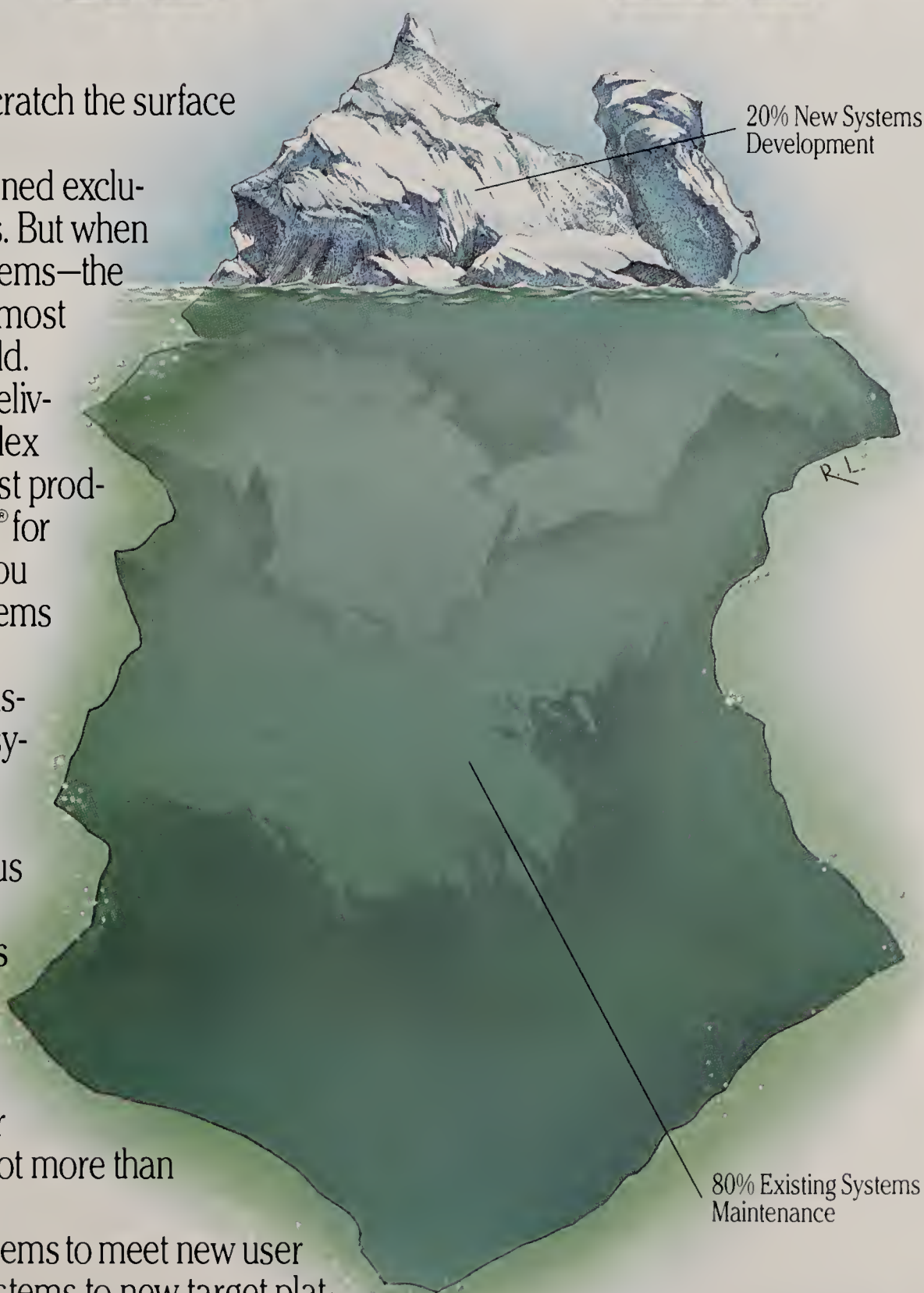
Fortunately, one company delivers a complete CASE solution: Index Technology Corporation. Our latest product offering,  Excelerator[®] for Design Recovery, lets you bring your existing systems into the CASE environment.

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"The biggest challenges we face in 1991 are keeping up with new technology, deciding when to adopt and when to wait, and impressing on our employees the need to change with the technology."

Leslie K. Falkner
Vice President of Administration, CIO Publishing Inc.



Month after month, you read in the pages of *CIO* what's happening at other companies. I thought a good start for the New Year would be to talk about managing the information resources at *CIO*.

At the departmental level, our group managers are concerned with the same issues as many readers: sharing information on a timely basis, the ability to be online with our various constituents, LAN versatility and, on the editorial side, desktop publishing.

Enterprisewide, our 1991 goals are to connect our remote offices to our headquarters, standardize on software products (being sure that everyone has the same release), network our division and create a centralized database to electronically sort and store our files.

We've just completed the installation of anti-virus and security products and instituted regular backup procedures. Our major goals for 1991 are to gently compel employees to change their work habits to accommodate central information storage and to be certain that they have the training required to be most effective at their jobs. All of this, of course, against a background of business as usual!

As we grow, my biggest challenge is to have the foresight to anticipate future requirements while preserving the investments we've already made. No matter what the industry or size of the company, we all have similar concerns. I wish all of you personal and professional success this year.

Wm L. Lutz

P.S. The next CIO conference (Perspectives: Maximizing Profits Through Information Technology) is scheduled for Sunday, March 10, through Wednesday, March 13, at Amelia Island Plantation in Jacksonville, Fla. Call Lori Cardarelli or Diane Martin at 800 343-4935 or, in Massachusetts, 508 872-8200 for more information on the conference, or look for the ad in this issue.

Coming In CIO

IT Business Analysts

Systems people in some organizations have left the IS cocoon for the rough-and-tumble world of operations. Their objective is to take on a broader role and solve problems in business terms.

Cooperative Processing

If your mainframes or minis are linked to PCs, you're probably spending more time, money and processing power than you need to and getting less integration and ease of use than you should. Cooperative processing can change all that.

In Good Voice

Telephone networks have helped companies transcend the spatial restrictions of doing business; now voice-processing technologies are enabling them to overcome the temporal constraints as well.

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Your success is how we measure ours.

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TRENDLINES

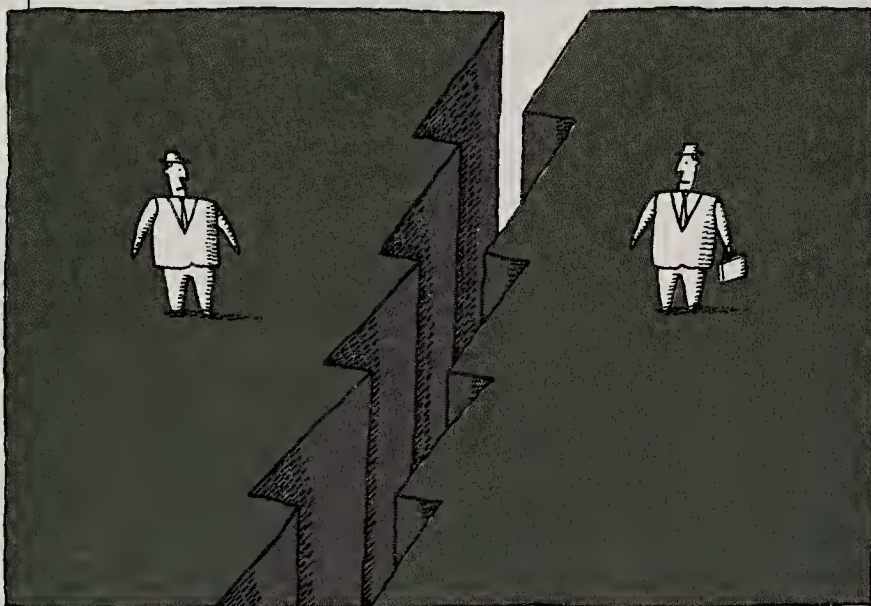
VENDOR RELATIONS

SURPRISE SHUTOFFS ARE A TURNOFF

Can you trust your software vendors not to exact a crippling penalty by remotely shutting down your systems without warning?

This question is on the minds of the people at ADAPSO,

based cosmetics company in advance and halted the distribution of an estimated \$20 million worth of orders. Revlon insists it withheld payment because the software did not work as promised. Logisticon is asserting its right to elec-



the computer software and services industry association, following an incident between a vendor and customer.

In October, Logisticon Inc., a software company based in Santa Clara, Calif., used an access key (embedded code that allows vendors to prevent unauthorized or illegal use of software) and a phone link to disable Revlon Inc.'s inventory-management systems for three days. Citing non-payment of \$180,000, Logisticon did not notify the New York-

tronically "repossess" its code, while Revlon has filed a lawsuit charging Logisticon with committing "commercial terrorism."

According to an official of ADAPSO, the installation of access keys in software products has been an established practice for years. "An access key is not a virus," said Doug Jerger, the director of ADAPSO's software industry division. "It's an integral part of the software products that vendors sometimes use to

TUBE STAKES

Zenith Electronics Corp. of Glenview, Ill., has launched a frontal assault on the technology gap in high-definition TV picture tubes. And it is getting the support of the state of Illinois, which has agreed to pony up \$1 million in economic-development assistance for the effort.

"Illinois cannot afford to take a back seat to other states, let alone other countries," Zenith wrote in its successful grant proposal. "Zenith plans to leapfrog over the competition with new production processes and, by doing so, capture new markets for Illinois and create new jobs for Illinoisans."

Working with Elgin (Ill.) Precision Glass, Zenith hopes to create a more precise and efficient process for placing phosphors on the large-screen version of its flat tension mask picture tube. The work is also being supported by the U.S. Defense Research Projects Agency, which kicked in \$1 million last August. ■

control the use of the software."

While it supports a vendor's right to use an access key, ADAPSO believes that Logisticon was not justified in tampering with Revlon's systems without prior notification.

ADAPSO is most concerned that this incident will compromise what Jerger described as the "delicate balance that already exists between vendor and customer." However, Jerger believes that the negative publicity surrounding Logisticon may encourage other vendors to solve disputes by less drastic means (see related story).

Jerger said that access keys should be regarded as a last resort. Otherwise, he said, "the benefits of using them are not sufficient to risk breaching the trust between vendor and customer." ■

TURN DOWN THE VOLUME

Talking to someone with a speaker phone may be the most dreaded form of telephone torture since the invention of the hold button, according to a survey by the Menlo Park, Calif.-based temporary-employment agency Accountemps.

Almost half of the business executives surveyed (46 percent) said they disliked conversing when their voice is being broadcast over a speaker phone; of those, 2 percent refuse to hold such conversations entirely. Fifty percent of the respondents who said they disliked speaker phones cited potential lack of privacy as their main objection.

"Telephone etiquette is an important part of doing business professionally, and the survey findings confirm the need to ask the other party's permission before using the device," said Robert Half, founder of Accountemps. ■

ARBITRATION CENTER FORMED

The "S" in ADAPSO could stand for Solomon. The trade association for the computer software and services industry has established the Bernard Goldstein-Milton R. Wessel Dispute Resolution Center to arbitrate computer-related controversies. The Center is being launched with a three-year pilot, alternative

dispute-resolution program. In addition to traditional arbitration and mediation, the program will offer a Settlement Panel flexible enough to meet the needs of each controversy presented, and a Panel of Computer Specialists that can furnish impartial opinions on technical, economic and legal issues. ■

TRENDLINES



TRAVEL SERVICES

REMOTE-CONTROL CAR RENTAL

Airports and hotel lobbies are sensible places for business travelers to rent cars. But when people need to rent or return a car back home, a shopping mall, office building or auto-repair shop is a more convenient location. After a successful test run in the Dallas-Fort Worth area, Chicago-based Budget Rent a Car Corp. is ready to roll out a new way to be where the locals are.

Budget calls them "remote transaction booths" (or RTBs). But think of them as car-renting ATMs and you get the idea. The three-by-five-foot RTBs, made by RT Technologies of San Antonio, Texas, have a curtain for privacy, a seat for comfort, a telephone that connects to an off-site Budget reservation agent, a video camera so the agent can see and record your face and driver's license, a card reader to capture credit-card information, and a printer to type out a contract. Finally, there is an ATM-like withdrawal door that opens to deliver car keys once the renter has signed the contract. An



BUDGET: *That competitive drive*

LED AROUND BY THE NOSE

The Smell & Taste Treatment and Research Foundation Ltd., of Chicago, has released a study indicating that consumers might just be willing to pay through the nose for goods displayed in a fetchingly fragrant setting.

The study, authored by STTRF director Dr. Alan Hirsch, compared the reactions of 35 subjects to pairs of Nike athletic shoes displayed in rooms identical except for the way they smelled: One room was odor-free, while the other had been sprayed with a "mixed floral scent" that, in the words of the study, has been shown to have a "positive hedonic impact." (Parenthetically, aficionados of "mixed floral" language will be hedonically impressed to learn that study subjects were not told "that the sensory modality being tested was that of olfaction." Got it?)

Anyhow, back at the study. . . . Eighty-four percent of the time, the desirability of the shoes was enhanced by room odor. Conversely (no pun intended, sneaker fans), 16 percent of the subjects were nega-

tively swayed by the

odor (a disproportionately large percentage of these odor-averse types were smokers). Women in the study were more likely to be positively influenced by odor than were men.

Probably the most heartening news for retailers is the apparent link between dollars and scents: Several respondents indicated a willingness to pay an average of \$10.33 more for the shoes they evaluated in the sweet-smelling environment than for the shoes in the deodorized room.

Good news for the hidden persuaders, yes. But for those who believe that the world is sufficiently fragrant or that there are enough devious ways to manipulate the buying impulse, Dr. Hirsch's study is cause to be sniffy. In fact, it positively stinks. ■

RTB can operate anywhere there are two telephone lines, electricity and a parking lot.

"The competitors have comparable technology, but it is geared to their frequent-renter programs," said Kevin McShea, senior vice president of Budget Rent a Car's Technical Services Group. "This allows us to open up our capabilities to any viable renter."

Budget hopes RTBs will enlarge the market for car rentals. In Dallas, RTBs were installed at Sears Automotive Centers and in a few Sears department stores. According to McShea, 42 percent of the people who had rented through the RTBs had never rented from Budget before; 87 percent who rented through the machines said they would do it again.

Budget is now looking into placing RTBs in downtown office buildings as well as airports. Booths currently exist in Minneapolis, San Francisco and Seattle. ■

SHORTHAND FOR THE SHORTHANDED?

Office automation may be adding a negative twist to the term "one-minute manager."

Mid-level managers are spending too much time on clerical tasks and not enough time doing what they were hired to do—namely manage, according to a study from the Georgia Institute of Technology in Atlanta. Associate Professor Peter G. Sassone asked 184 managers to keep an hourly log of their activities, which he later categorized according to the intellectual content of the work. He found that middle managers spend only about one quarter of their time actually managing, while support tasks (filing, making copies) and non-productive activities (traveling, looking for a parking spot) account for nearly one third.

Sassone blamed this phenomenon on the loss of administrative and support staff who have been replaced by PCs or fallen victim to the boom/bust cycles of business. "Managers are doing the best they can, but they're often constrained by inadequate technology and an inadequate number of support people to help them," Sassone said. He believes many companies could drastically increase productivity and profits by rethinking staffing requirements, redefining job responsibilities and taking full advantage of IT.

Or maybe Harvard Business School could start offering classes in shorthand. ■



"My ultimate PC system? It's got to be compatible with everything I've got already... so you can move data from one PC to another on a floppy."



"Networking PCs is a pain. I'd like them designed to do networking without lots of configuration work... in networks I've already installed."



"The perfect PC would be an ideal client to all my information systems... putting data in the hands of decision makers in a form they can use."



"I'm tired of vendors changing operating systems. I want to drop a new box on my executives' desks and know their software will run."

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"A graphical interface is clearly important... users love 'em. But the architecture has to be designed to handle it without compromising performance."



"I'd like to see more discipline from software developers. Commands should be consistent for every application... it would eliminate retraining costs."



"Off-the-shelf software isn't enough. I need serious tools my existing programming staff can use to develop custom apps quickly."



"Macintosh? No kidding?"

Secret desire of 200 IS managers.

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And they wanted development tools that would let their existing programming staff build applications quickly and easily. Like Macintosh.

In short, they wanted everything that Macintosh offers. But they just didn't realize they could have it today. For details, see an authorized Apple reseller.

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TRENDLINES

ON THE RECORD

Female graduates of business schools earn an average 12 percent less than their male counterparts, according to a survey reported in a recent issue of *Business Week*. What's more, the disparity increases dramatically in the IS world: Women taking jobs in information systems upon graduation earn only \$38,950 compared to men's \$50,441—a whopping 29.5 percent difference.

Of course, there may be factors at work that are not immediately apparent. Perhaps the male B-school graduates have more prior work experience, or maybe women choose to take lower-paying jobs in exchange for greater flexibility and other considerations.

However, in light of the enormity of the discrepancy, offering such justifications "suggests that there may be a bit of a head-in-the-sand attitude at work here," as *Business Week* so aptly put it. Clearly, this issue deserves attention from business-school officials, corporate recruiters and IS executives employing MBAs. ■



TELECOMMUNICATIONS

SHRINKING THE CORPORATE PHONE BILL

Thinking globally and acting locally may work for environmentalists, but companies looking to cut telecom costs should take a planetary approach.

According to a white paper prepared by Booz-Allen & Hamilton Inc. consultants James Kennedy and Sandra Tuck, who are based in Bethesda, Md., departmental or business-unit cost-cutting measures are inadequate means of achieving maximum economies. Broad corporate-wide initiatives, they say, have the best chance of realizing potential telecom cost savings of from 15 to 40 percent—savings, said Tuck, that "can exceed \$25 million annually [and] flow directly to the bottom line."

Where business-unit programs fall short is by being limited in their scope and the speed with which they are implemented, and in tending to focus only on politically easy goals.

The Booz-Allen report sets forth four tactics that it recommends businesses pursue in establishing a corporatewide cost-cutting program:

- Manage telecom service and equipment purchasing centrally and aggressively. In purchasing PBX equipment, for example, departmental buying could either be delayed or accelerated to take advantage of bulk-purchase savings opportunities.

- Modify or outsource telecom operations. In the wake of Bell divestiture, corporate telecom staffing costs have obviously ballooned. As labor costs rise for a relatively small pool of top-notch talent, the benefits of farming out routine operations become self-evident.

- Use the right tool for the job. Where appropriate, such alternative transport technologies as packet-switching, VSATs and leased lines can cut costs by from 20 to 30

percent.

- Redesign the entire information architecture to exploit the relatively lower costs of telecommunications versus the high cost of multiple data centers.

Key to implementing such tactics on a corporatewide basis is the vigorous involvement of the COO, who has both the needed perspective and the span of control to manage initiatives that cut across the organization. ■

KEEPING AN EYE ON ETHICS

The computer software and services industry association ADAPSO has invited an ethical watchdog into its fold.

The Software Business Practices Council, an organization dedicated to restoring the reputation of the software industry, has merged with ADAPSO, becoming a group within its Software Industry Association. Under the agreement, the SBPC retains its own identity.

The SBPC, formed recently by 17 corporations participating in the industry, uses customer education and peer pressure to promote ethical behavior and higher business standards. The non-profit trade association supports current codes and standards in high-tech marketing and advocates improving business practices in advertising, public relations, marketing, product comparisons and financial reporting. Affiliation with ADAPSO is expected to help the SBPC accomplish its objectives.

Jeffrey P. Papows, president and COO of Cognos Inc., and Robert Weiler, president and CEO of Interleaf Inc., will co-chair the organization. According to Papows, customers and vendors are being hurt by "dubious business practices," such as announcing new products before they exist and misrepresenting comparative product performance. "Unless the software industry stops alienating and confusing customers and engendering cynicism," he said, "the reputation of the industry as a whole will deteriorate and growth will suffer. It is now time to draw clear lines of ethical behavior."

Specific recommendations by the SBPC include recognition by vendors of distinctions between a product announcement and a statement of direction; use of present and future standards in product performance measurement; and public adherence to present and future Financial Accounting Standards Board and American Institute of Certified Public Accountants standards.

Membership in the SBPC is open to any vendor, provider, manufacturer, licensor, licensee, user, importer or exporter of software goods or services. It is also open to any other individual or corporation sufficiently connected with the software industry. ■

TRENDLINES

LITERACY LEVELS

RAISING ARIZONA'S

S ALSA and Apple may sound like the topping for a nouvelle cuisine version of nachos, but they have more to do with computer chips than the tortilla variety.

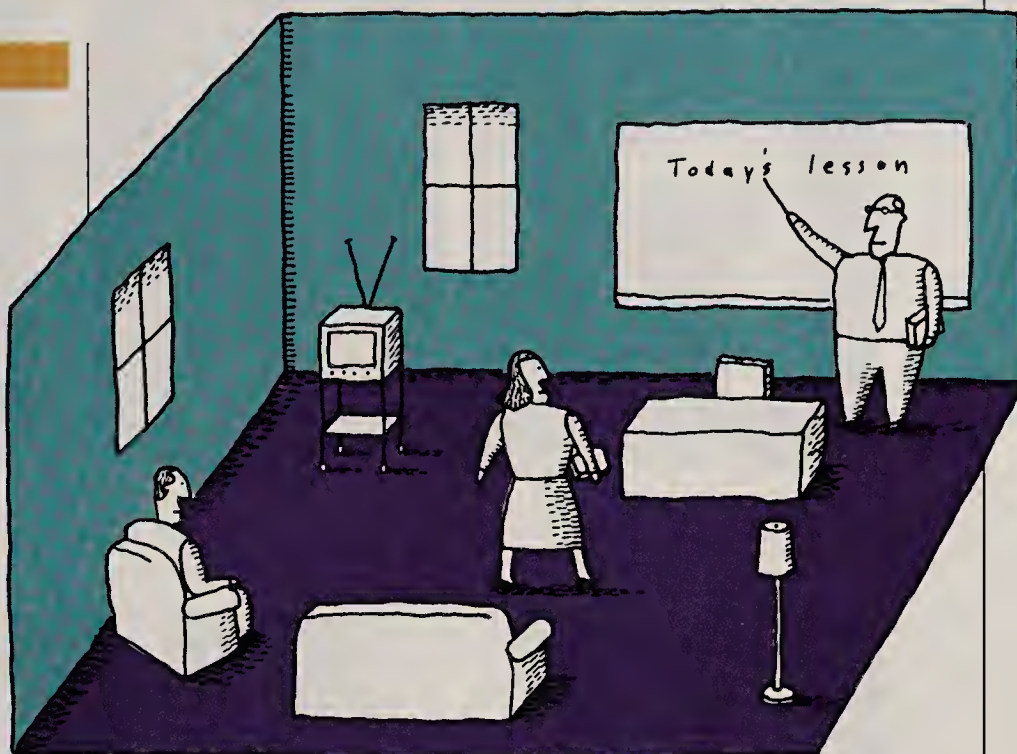
The Southwest Advanced Learning System for Adults is a computer-based effort to improve reading and writing skills among adult factory workers. Project SALSA, the first of its kind, uses earth satellite and telecommunications technology to link Macintosh SE computers in workers' homes with a library of interactive educational software located at the University of Illinois in Champaign.

The project was designed to show that home-based computer education (when used as a supplement to traditional classroom education) can shorten the time needed for factory workers to reach a desired level of competency in reading. A secondary research objective was to ascertain whether other family members would benefit from having the system in their homes.

"We see it as a double payoff, meeting current needs while impacting the work force of the future," said Jim Frasier, senior retraining programs supervisor at Motorola University, an education and training unit of Motorola Inc.

Fifty-three employees of Motorola's Mesa and Tempe, Ariz., semiconductor plants participated in the pilot program, which ended last month. They received two hours of training on the Macintosh computers, provided by Apple Computer Inc., and 10 hours of training in use of the instructional software.

Within the first nine weeks, participants had already logged more than 2,000 hours on the PCs, "meeting and in some cases exceeding our expectations," according to Frasier. Particularly gratifying were reports of family members taking advantage of the 100-plus subjects available on NovaNET, the University of



Illinois' satellite-based network for delivery of educational services. Frasier cited as examples a high-school junior studying French, English and Spanish, and a 9-year-old Navaho girl getting her first exposure to that language in its written form.

Frasier said the company would decide whether or not to continue the program after it sees the research results, being compiled by Rio Salado Community College in Phoenix. If SALSA is judged a success, Motorola will consider extending it outside of Arizona to some of the company's other locations. ■

ON THE STUMP

A Washington political action committee has come up with a new, computerized way to get out the vote and raise money at the same time.

Before Election Day, the National Republican Senatorial Campaign Committee sent out a letter from Senate Minority Leader Bob Dole to Republican contributors. Each letter included the names of three other Republican contributors in the recipient's neighborhood, complete with their addresses and telephone numbers. The letter not only urged recipients to vote and donate money; it also urged them to ask the Republican Party supporters listed in the letter to vote Republican too.

The real purpose of the letter was to raise funds for the Republican committee, according to Albert Mitchler, the committee's finance director. Mitchler would not say how much money the letter generated for the Republicans, other than to say, "it produces a good fund-raising return." ■

DARK DAYS AHEAD

As winter closed in last November, American business leaders were feeling a chill in more than the air.

The Conference Board, a New York-based research group, surveyed nearly 600 CEOs in the closing months of the first year of the new decade. The generally gloomy bunch predicted slower growth for the U.S. economy in the 1990s and expressed concerns about a rash of economic ills, ranging from the federal deficit and health-care costs to the cost of environmental protection, an influx of inadequately trained workers and the foreign trade deficit.

One out of two respondents said the economy will

fall short of the 2.9 percent annual growth rate posted during the 1980s, while only one in six predicted it would grow faster. CEOs of manufacturing firms tended to be more optimistic about growth prospects, while leaders of financial, insurance and real estate firms had the gloomiest outlook.

"Anticipation of slower growth would suggest shifts in both strategy and tactics by many major firms," said Preston Townley, president and CEO of The Conference Board. "Clearly, the ingredients of a slower-growth economy have been building for months now, and the danger lies in the anticipation becoming a self-fulfilling prophecy." ■

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Who's the Expert?

Expert systems don't run by themselves. Somebody must install them, tune them, maintain them—and decide who'll be held accountable for the actions they trigger.

BY DAVID BLANCHARD

While much has been written about how a company should go about implementing expert systems, there are several critical management issues that are unique to their maintenance, and there is precious little precedent to fall back on. Companies employing expert systems need to take a variety of factors into consideration. These include assigning responsibility for an expert system's decisions; maintaining the system in a climate of changing policies and new technologies; customizing the system for disparate users; and preventing employees from relying too heavily on it.

The question of responsibility should be of concern to anyone authorized to implement the decisions of an expert system. If the expert system recommends a plan of action

that, when executed, leads to an expensive mistake, is it the fault of the user, who was just following orders, albeit orders from a computer program? Employees need to know where the culpability will lie.

ITT Commercial Finance, based in St. Louis, has made it clear just where the buck stops. The company uses the Expert Credit System (ECS) to assist the credit decision-making process for inventory financing (also known as floor-planning). ECS analyzes credit information, identifies the strengths and weaknesses of credit proposals and then offers credit recommendations to ITT management. The system is consulted for every transaction; however, the senior manager who signs off on the loan is held responsible for the decision.

"We advertised internally that ECS is a tool, not the ultimate decision-

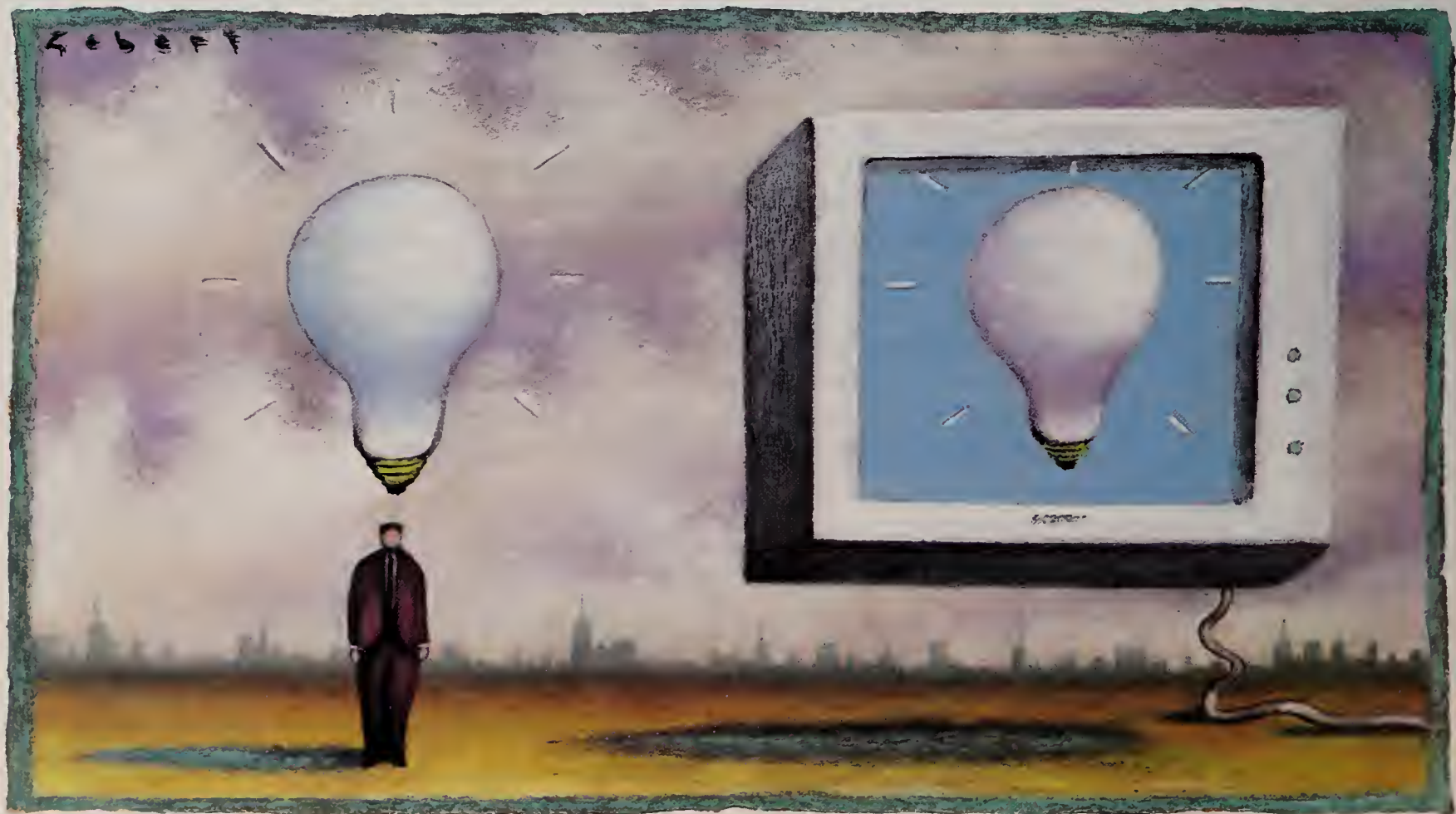


ILLUSTRATION BY WARREN GEBERT

maker," explained Emery Saladin, vice president and director of credit for operations administration. "It is a method of assembling the information, putting it in a consistent format, processing it very quickly, and using the logic that the senior managers put into it."

Similarly, at Shearson Lehman Brothers of New York, where 100 employees companywide use trading-support advisory systems, the responsibility for a decision ultimately lies with the trader. "A trader's responsibility, his pay, his commission structure, his whole reason for being is to make a sound decision," said Ira Morrow, vice president of technical planning. "The securities business is information-intensive, and an expert system is just another input in the decision-making process." The expert system, he emphasized, does not give advice directly to clients; its recommendations are filtered through the high level of expertise of Shearson's traders.

At E.I. du Pont de Nemours & Co., on the other hand, which has developed nearly 1,000 expert systems, primarily for industrial and troubleshooting diagnostic applications, no clear management policy has yet been established that dictates exactly where the responsibility lies for an expert system's decision. Du Pont's Nylon Intermediates plant in Maitland, Ontario, for instance, uses a Waste Treatment Plant Advisor, an Azeotropic Distillation Quality Control with Heat Recovery system and a Reactor Start-up system. "We are not dealing with very high visibility issues here, where if you make a mistake, somebody is going to come back and say you followed or did not follow the expert system's advice," explained Waguih Zaky, senior process engineer at du Pont's Maitland plant. "We do not yet have a clear guideline that says, 'This expert system has been validated, and you must follow its advice, or if you do not follow it you have to do such-and-such.'" Zaky does foresee that at some point, during critical decision-making processes, the user will have to explain why he did not follow the

advice of an expert system.

Generally speaking, then, the responsibility for a decision remains with the user. Indeed, with most companies it becomes something of a public relations strategy to emphasize that humans are continuing to make those vital decisions that affect people's lives and livelihoods, and that the expert systems are used to bolster the decision-making process. Even at a company like ITT, where most customers are in the IS business and understand the value and re-

*"A trader's
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the decision-making
process."*

—Ira Morrow

liability of expert-system software, there remain skeptics.

"Some of our customers who have been in business for many years in mature industries are used to having decisions made based on the 'good ol' boy' theory," Saladin explained. "In other words, a customer has been around forever, and he's a good ol' boy, so therefore you should make the loan. We have to educate these customers a little bit about expert systems. Basically, we reassure them by explaining that it will be the

senior executive in the region where they are located who is ultimately responsible for the lending decision, not the expert system."

Maintaining the expert system is another crucial problem. An expert system is only as good as the information put into it, and that information has to remain current. Digital Equipment Corp., for instance, which claims an annual return of upwards of \$140 million on its AI technology, employs a full-time staff to maintain its expert systems as new technologies affect the company's products.

American Express employs its standard maintenance and operation support group (rather than its AI development group) to update and maintain its Authorizer's Assistant to quickly reflect changing credit policies, often within 24 hours of the change. This maintenance includes coding the changes, expertise testing against offline case data, online testing within a test environment, and final release into production utilizing change-control procedures.

ITT is currently working on version 3.0 of its ECS. Kurt Ruhlin, senior portfolio/MIS analyst and a co-developer of the system with Saladin and two others, noted that ECS has been modified substantially since its introduction in 1987. "As we have been using the system, we look at the results and see what we may have missed or overlooked or not gotten quite right, and then we tweak the system a little bit," Ruhlin said. "We have not found any critical mistakes, but there have been little glitches that we had to modify and correct by applying different amounts of weight to different issues."

They were alerted to the need for modification when ECS began rejecting transactions with companies with which ITT had been doing business for several years. In some cases, these rejections endangered relationships the company wanted to continue. Saladin gave this example:

"We have several types of financing programs, one of which we call 'pay-as-sold,' which means the customer

is supposed to pay us as soon as he sells the product. In reality it does not happen like that—we usually get checks once a week or so.” But ITT had programmed its expert system to consider more than 30 percent of the total monthly payment at floor inspection as a negative factor. “We have since modified that to a larger percentage,” Saladin said, “not only because of the cyclical nature of the business, but also because for a lot of the old-time dealers, this is just the way they have done business, and after 25 years you are not going to change them. We did not want to reject that file and cancel the credit line because of that, so we modified the system.”

In some cases it's necessary to customize different versions of an expert system for various users. NYNEX Corp., in White Plains, N.Y. has installed the Maintenance Administrator Expert (MAX) at 40 centers throughout New York and New England (see “Expert Opinion,” CIO, December 1990). MAX is used to diagnose problems with residential and small-business telephone service. While NYNEX does not have a policy on the use of the expert system, it does have one on installation. According to Jack Flamholz, MAX project leader, “With 40 users throughout our region with different geographical and physical circumstances to deal with, and each center [having its] own local procedures for dealing with unique situations, the users have to learn to customize the system to make sure it is not impractically [inflexible]. We need to make sure MAX does not actually create more work for people than it saves because it is unaware of the way people deal with problems in different settings.”

NYNEX's Expert System Lab recently hired a retired telephone company employee who used to run maintenance centers to support MAX, and part of that support involves customization. The support person goes to a maintenance center to check on MAX's performance and, if necessary, runs a small test based on trouble cases, tracing what MAX

recommended in situations where it was at odds with what the maintenance center manager wanted. MAX is then fine-tuned to fit the circumstances peculiar to that center. “We originally thought it would be easy to monitor the quality of MAX's decisions,” said James Euchner, director of the Expert System Lab. “We have a trouble-repair history database that is updated daily, with a wealth of data at our disposal. The problem is that it is subject to various types of corruption, such as coding errors and large

“With most companies it becomes something of a public relations strategy to emphasize that humans are continuing to make those vital decisions that affect people's lives and livelihoods, and that the expert systems are used to bolster the decision-making process.”

seasonal fluctuations.”

In the past, NYNEX carried out an in-depth manual check of MAX's performance. Four centers that had customized MAX were chosen, and 200 trouble cases were selected at random and then evaluated by an expert from the telephone company to determine whether MAX helped or hurt the decision-making process. “We were very pleased with the results,” Euchner reported. “What we are grappling with now, though, is how to be able to check MAX automatically, and have it become self-tuning.”

Another problem facing managers is employee overreliance on the expert system's decisions. ITT's Saladin, for one, expressed “some fear” of this. “Senior management is relying on [the system] quite heavily,” he noted, “and we have to be on constant vigilance to make sure the data is pure and what they are seeing is the true story.” ITT has internal audits and procedures to constantly monitor the decisions and ensure they are correct.

According to Shearson Lehman's Morrow, “It becomes a problem of familiarity, especially if the system's advice turns out to be correct more often than not.” One way Shearson Lehman attempts to both maintain the expert system and guard against overreliance is by “checking your assumptions.” In other words, when the expert system was first developed, the underlying assumptions of the human expert were defined. As the system is used, Shearson's managers monitor whether those assumptions are still valid by checking the system's decisions against what their own would have been under the same circumstances. Because employees are aware that the assumptions are being reevaluated and are subject to change, they are less likely to depend exclusively on the system.

Monitoring the assumptions is such a difficult process that it cannot be done constantly, “but we know that if we do not do it, it can ruin the entire system eventually,” Morrow said.

Finally, no legal precedent has yet been set regarding negligent use of expert systems. Jay Liebowitz, associate professor of management science at The George Washington University in Washington, recommends the use of disclaimers, as well as full disclosure of use of an expert system where appropriate. Obviously, this issue is destined to be settled in the courts, but until then discretion should be practiced. ☐

David Blanchard is editor of AIWeek, an Atlanta-based newsletter that tracks the artificial intelligence industry.

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Source: Gartner Group 1990

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What do trees and information systems have in common?
At Boise Cascade, almost everything.

THE FOREST FOR THE TREES

BY DAVID FREEDMAN

When Patricia Slutz talks about her company's growth opportunities, she's not thinking about mergers and acquisitions, new markets or even increased profits. She's talking *biological* growth—specifically, that of trees. That's because her company is Boise Cascade Corp., one of North America's leading producers of timber products.

Of course, nature seems to have always done a pretty good job of

growing trees without any help from corporate America. But Boise Cascade has a certain amount of work to do itself. In fact, the company is faced with a bewilderingly complex array of variables that affect every decision it makes about its timberland. To help it navigate through these complexities, the company has turned to a geographic information system (GIS) linked to conventional databases and other systems. The results have changed the way Boise Cascade runs its timber business—

PATRICIA SLUTZ sings praise for Boise Cascade's geographic information system from the treetops.

PHOTO LEFT BY GLENN OAKLEY, PHOTO RIGHT COURTESY OF BOISE CASCADE CORP

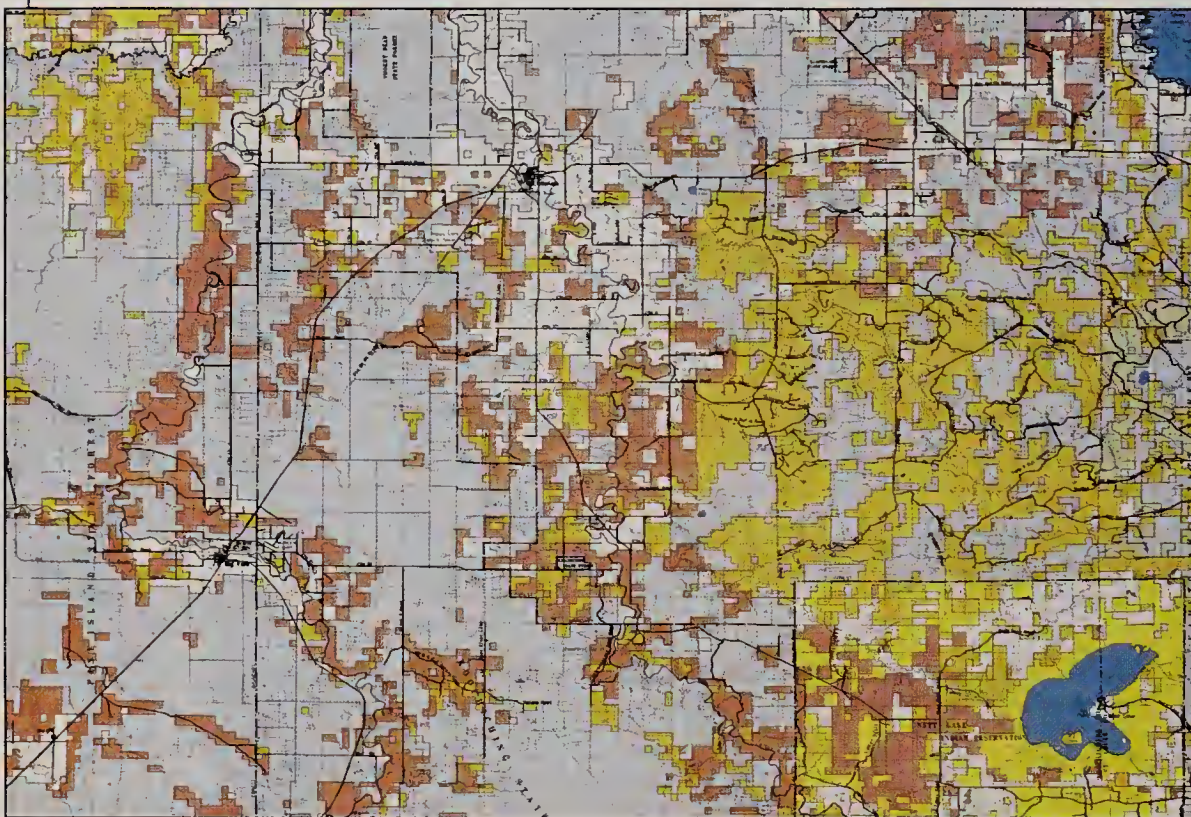
and should eventually go a long way toward helping to manage some large chunks of U.S. timberland.

There's nothing new about timber management being treated as an information-intensive science, noted Slutz, manager of information services for the timberlands company, headquartered in Boise, Idaho. Wood producers have long faced questions about which types of trees should be grown on which land for how long and with what techniques, taking into account current and projected prices for different wood products as well as

ing at the map to find the stands that corresponded to the ones in the report, checking back and forth and making notes on both as you went along."

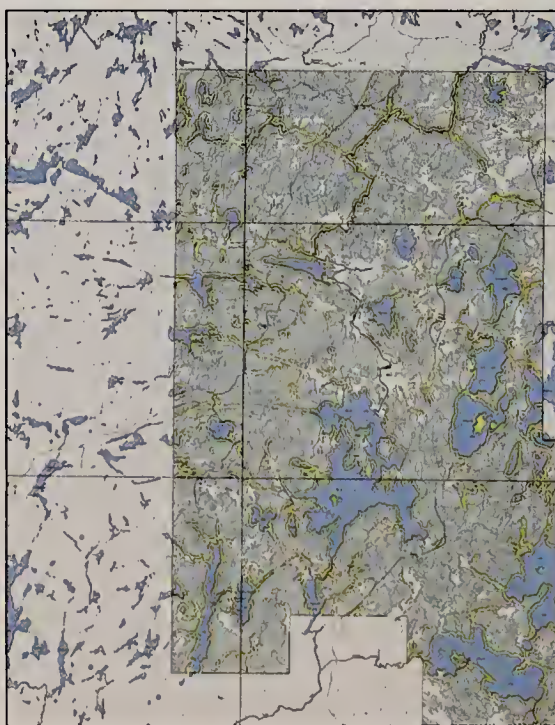
The GIS that Boise Cascade acquired 10 years ago—and that it has been enhancing ever since—has changed all that. "Basically," said Slutz, "now you just sit down at a workstation and use the system to retrieve and analyze your information to get at an answer, which can then be plotted on a color map." Not only is the information more accessible

A geographic information system (GIS) has changed the way Boise Cascade runs its timber business—and should eventually go a long way toward helping to manage some large chunks of U.S. timberland.



the desire to maximize profits while also ensuring that timber resources remain renewable.

In the past, however, most of these variables were juggled in someone's head based on information printed on paper. Even when Boise Cascade turned to computerized databases to start tracking timber information a decade ago, said Slutz, the decision-making process was still a very manual one. "You'd have a great big map on the wall that showed everything you owned," she recalled, "and you'd have an inch-thick report in front of you that listed every stand of timber, describing the species of tree, the number of trees, the diameter of the trees, bug problems and so forth. Then you'd spend a lot of time flipping through your report and look-



TIMBER MANAGEMENT made easy with high-quality, computer-generated maps

and of higher quality, she pointed out, but the number of people able to make use of it has mushroomed as well. "The forester with 20 years' experience may see more on the map than the forester with two years' experience," she said, "but the system can help them both to make the right decision. It gives the kind of comprehensive, absolutely current, completely objective information we need to meet our timber-management standards."

Not surprisingly, the results have had a tremendous impact on the company's day-to-day operating decisions. The system helps determine logging plans and log-transportation scheduling—and sometimes it simply makes it easier to find trees. "If you need a particular species or volume of trees," said Slutz, "the GIS can sort everything out and let you look at where all the stands are that meet your specifications. It lets you put together plans much more quickly and, because you're seeing it all on a map, much more intuitively."

The system has even become an integral part of the timber division's strategic decision-making. If strategy simply consisted of bringing in as much money as possible over the next few years, then the company would have little to think about; it would cut down all its mature trees and sell them. Fortunately for the environment, there are other issues in-

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SI BALCH practices strategic forestry by "logging on" to a computer.

involved. "It comes down to a question of why you own timberlands," explained Slutz. "Boise takes the point of view that we have a long-term stewardship over them; we consider them to be a strategic advantage, and we want to make them as productive as possible over as long a period of

time as possible. To do that, we have to identify all the alternatives for treating the timberlands and understand the biology and economics of each of those alternatives."

Further complicating the picture is the constantly shifting ocean of regulation affecting the company's options. As the nation becomes more and more environmentally aware, for

example, many states are enacting or considering laws that limit the practice of "clear-cutting"—that is, cutting down all the trees in an area. Most controversial of all is large-scale clear-cutting, where everything in sight is leveled for miles around. "We don't do large-scale clear-cutting," said Slutz. "But sometimes clear-cutting a smaller area is the best way to



get enough sun to the ground to allow healthy new growth, and it's an integral part of our program. So we have to consider how we'd be affected by new laws that would limit or even eliminate clear-cutting. That's the sort of strategic question we can address with our GIS."

Of the 10 regions that operate timberlands, none is more dependent on

its GIS than the one in New England. Si Balch, the chief forester for the New England region, uses its system—which is similar, but not identical, to the one developed at headquarters—to aid in virtually every aspect of managing the 660,000 acres of prime timberland for which he is responsible. "I can't quantify the benefits of the system—God, I wish I could," said Balch. "But we know it has allowed us to make the leap from managing small patches of timber at a time to doing good, strategic forestry over an entire forest. We can harvest as much wood as possible, which is how you make money in this business, while feeling comfortable that we're doing what's biologically correct to provide us with wood forever into the future."

The key to the region's success with the GIS, said Balch, is the way in which the system is linked to a database and a modeling package. The database is a repository of characteristics for each of the 16,000 "segments" into which the region's timberland is divided; each segment is a geographically defined patch of woods in which the trees are of one species and share roughly the same height, diameter and tree-to-tree spacing. In addition to these characteristics, the database keeps track of drainage conditions, growing potential for other tree species, logging conditions, environmental regulations that may apply to the segment and other information. The GIS itself can display any of this information through a color map, helping to pick out, for example, all segments containing a certain species of tree in which the trees have reached a certain average height. It can also overlay roads, water paths and segment boundaries onto maps.

The brains of the combined systems is the modeling package. This software allows plugging in a set of goals, requirements and constraints; it then sifts through the database for the relevant information, makes calculations based on the data to meet the specified needs, and displays the results through the GIS. "The model

GIS "has allowed us to make the leap from managing small patches of timber at a time to doing good, strategic forestry over an entire forest."

—Si Balch

puts together the combination of cutting practices that best achieves our timber-management objectives," said Balch. "The GIS then prints out a graphic representation of what you need to do, and that's what you take into the woods with you."

Balch often asks the system, for example, to determine whether or not it's worth pumping extra money into a timber stand to speed its growth through such practices as planting genetically improved species, removing brush and other vegetation or even using what Balch calls a "giant weed-whacker" to selectively cut trees and thin out the population. (Of the 25,000 trees that typically spring up in an acre, only 1,000 will grow to merchantable size.) "In New England, the land grows trees anywhere that isn't paved," he explained. "Without spending any money at all you can get a harvestable crop of trees in 60 years. If you spend the money, you can have that same crop in 30 years. Whether or not that's worth it depends on how the prices of wood and wood products vary." Thus the system can show how much money should be invested in which stands based on price projections.

The system has helped Balch develop alternative harvesting practices that could be employed to deal with hypothetical clear-cutting restrictions. It has identified those areas (based on land conditions) and times (based on market prices) where it makes sense to plant softwood trees like balsam fir and redwood, used mostly to make paper and other wood-fiber products, and those that



GIS: From first cut to final product, the system helps Boise Cascade make the most from its timberlands while maintaining a "long-term stewardship" over the trees.

call for hardwood trees like sugar maple or American beech, used primarily for furniture and construction. The system has also determined the most effective way to grow trees of mixed ages, which can increase the land's productivity, though at the cost of requiring more expensive, selective harvesting. "The system is really helping us play a chess game with the land," said Balch.

As invaluable as it may be, the system's advice is not taken as gospel. "What comes out of the computer doesn't always quite fit with reality," said Balch, "and we've got to adjust for that on the ground." The system

sometimes prescribes cutting a large stand, for example, while leaving untouched a neighboring stand at the edge of a forest; the system is oblivious to the fact that the benefits of leaving the bordering stand alone might be wiped out by the extra costs of having to transport cutting equipment and logs through the uncut section. Balch also said the system sometimes suffers from incomplete or inaccurate data—a problem he believes is due to the fact that in years past a lot of people at the company never took data-collection very seriously because there was no clear sense of the payoff. "When the program was instituted, the whole thing seemed academic to the people that were gathering the data," he explained. "But now that they've got a map that shows them what needs to be done to manage the land, a light bulb has gone on in their heads. All of a sudden everyone is making sure we're getting the right data and that it's accurate."

Refining the data-collection process also involves eliminating the gathering of less-useful data, noted Balch. "When you start off with a system like this, you think about the exciting possibilities of gathering all this wonderful data," he said. "But collecting data takes time and money,

"The system is really helping us play a chess game with the land."

—Si Balch

and after a while you ask yourself what's worth bothering over and what isn't." Originally, for example, the system tracked land elevation and slope. Those characteristics are useful to foresters in the more rugged Pacific Northwest forests but have little impact on decisions in New England, so Balch dropped them.

Even as the wrinkles are being ironed out of the system, Boise Cascade is making plans to add enhancements. Slutz's group is looking into tying satellite images of the company's timberland into the GIS, which would allow it to produce maps that are far more realistic, informative and up-to-date. In addition, the company wants to develop an expert-system-based front end that would enable people with no computer expertise to sit down at a workstation and pull out useful information.

As it is, the system has already paid out at least one unexpected dividend: Balch said it has helped him and a lot of other people at the company develop a better sense of the need to take certain actions now in order to achieve desired results decades down the road. The most basic of these desired results, he added, is the preservation of the timberland, and of the entire ecology. "When you're driving along and you see a deer in the field," he said, "and you say to yourself that you want to see a deer standing in that field 20 years from now, you have to do a lot more than simply protect the deer you're seeing right now. That deer is going to grow old and die no matter what you do. It takes a lot more to make sure that there are enough deer and enough forest to keep things going into the future." □

David Freedman is a freelance writer based in Brookline, Mass.

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ARE WE THERE YET?



Our second annual survey of non-IS senior executives reveals that significant obstacles are slowing the CIO's journey to full strategic partnership. There is still a seat at the table, but getting to it may require a new approach.

BY DAVID FREEDMAN

On the theory that information executives ought to be able to profit from an awareness of how they are seen by others, CIO commissioned Coopers & Lybrand to survey the attitudes of the people in top management to whom CIOs are most likely to report. The survey of CEOs, COOs and CFOs in leading U.S. organizations was directed by Michael Bealmear, who is in charge of planning in C&L's Computer Assistance Division; Ronald Brzezinski, a partner at C&L's Strategic Systems Services Division; and Jacqueline E. Jeffrey, marketing director of C&L's Management Consulting Services Division. The following article is based on the raw survey data and on an interview of Bealmear and Brzezinski by CIO freelancer David Freedman and Editor-in-Chief Marcia Blumenthal.

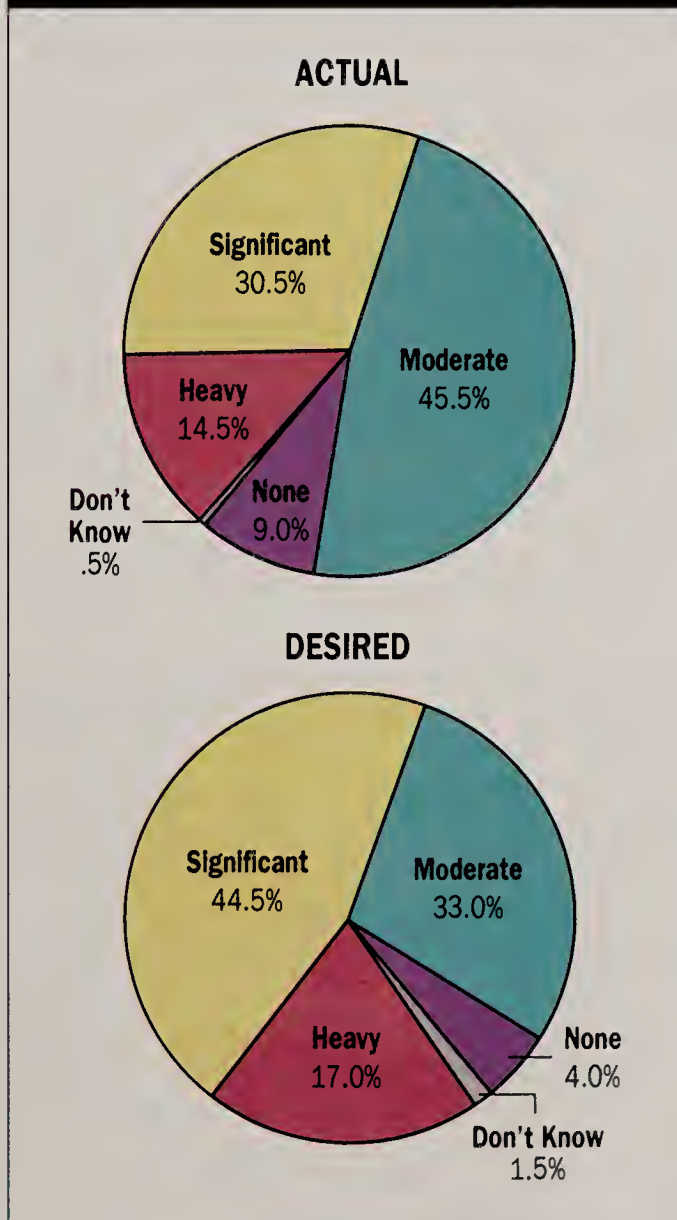
CIOs have continued to make great strides in their decade-long assault on the corporate suite, with many now routinely helping to chart their organizations' courses. But if the CIO has arrived, it may not be at the exact destination that he or she had counted on. Most CIOs are finding that management's inner circle remains elusive, with executives forming expectations for the maturing CIO position that often stop short of participating in enterprise-wide strategy formulation. That doesn't mean that CIOs have nowhere to go but down; it may just indicate that the rules of the game are changing, and that CIOs have to recognize that to take advantage of new terms for success and new ways of allying themselves with senior management.

That's part of the picture that emerges from a broad survey of senior executives sponsored by Coopers & Lybrand and *CIO* magazine, the second annual look at the attitudes of non-IS upper management toward the IS practice in their own organizations. Responding to the survey were 200 executives from many of the largest U.S. corporations—74 chief executive officers, 76 chief financial officers and 50 chief operating officers. These executives aired their opinions about a wide range of issues relating to their organizations' top information-technology manager (referred to generically in the study as the "CIO").

The results, presented here for the first time, suggest that most senior managers have tremendous respect for the CIO's achievements—as well as some ambivalence about his or her standing as a corporate leader. A majority of the executives, for example, said that CIOs should participate in strategy formulation; at the same time, they admitted that their CIOs have not yet been offered the opportunity to do so. A third of the companies indicated that the CIO reports directly to the CEO, and a quarter of the executives said that they consult with their CIOs on a daily basis. These are all healthy numbers, but there's still plenty of room for improvement.

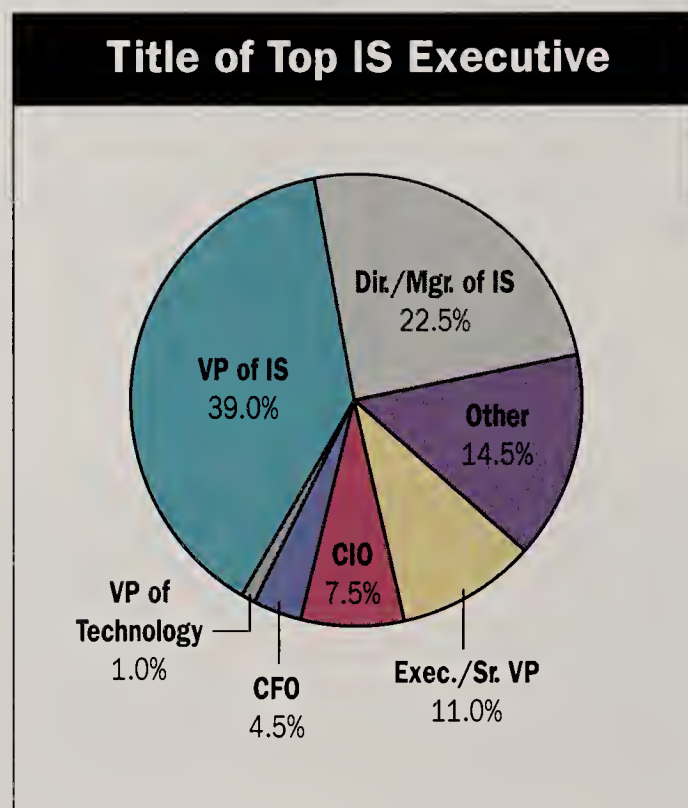
In addition, the great majority of executives insisted that the CIO's efforts have resulted in a competitive advantage for their businesses. Yet nearly half charged that the CIO has failed to clearly communicate IT's value to the organization. Individual CIOs are finally being seen as long-term members of management rather than job-jumpers, and they earn as much as or more than their management peers (those reporting to the same title as the CIO). Yet the

Degree of IS Involvement in Formulating the Overall Business Strategy



The gap between IS's actual involvement in strategy formation and the level of involvement desired by senior management should eventually translate into increased participation for the CIO.

While vice president of IS is still by far the most common title for IS function heads, the title CIO has become more prevalent in the last year.



number of executives who consider the CIO to be senior line-management material is actually shrinking.

How to reconcile these views? "The hype about the CIO is dissipating," said Ronald Brzezinski, a partner at Coopers & Lybrand's Strategic Systems Services Division in New York and one of the architects of the study, as well as the former CIO of The Quaker Oats Co. "Executives know more about the position, and their expectations are rising. But many executives think the role of the CIO is to make information more accessible so others can identify strategic advantages."

The good news/bad news aspect of the survey comes out clearly in the responses to questions about the CIO's participation in corporate strategy formation. Only 45 percent of the respondents said the CIO is now "extremely" or "very" involved in this area. But more encouraging is that 62 percent said that "ideally" the CIO should be extremely or very involved; presumably this gap will eventually translate into increased participation. Senior management at companies where CIOs are involved in strategy-mapping seemed pleased with the results: Only two executives—1 percent of the study's total—believed that the CIO should be less involved than he or she currently is, whereas 65 percent of the executives looked for increased involvement from the CIO.

According to Michael Bealmear, who is in charge of planning in Coopers & Lybrand's

Computer Assistance Division and was the co-architect of the study, management's reluctance to include the CIO in strategic decision-making represents something of a bait-and-switch tactic. "Two or three years ago management was saying they would bring the CIO into strategy formulation when he or she demonstrated a more solid understanding of the business," he explained. "Now the CIO understands the business, but we're still not seeing much movement in terms of the CIO participating in enterprise strategy-setting. Management is finding new excuses for keeping the CIO off the team."

The degree of strategic involvement also varied significantly with the type of organiza-

"If I were going to pin my hat on the one executive that was going to be IT's champion in the coming years, it would be the COO."

—Ronald Brzezinski

tion. For example, at financial-services organizations, which tend to take the lead in developing IT-based competitive edges, 53 percent of executives reported heavy CIO participation in strategic planning. In contrast, CIOs are closely involved in strategy at only 38 percent of manufacturing companies, where IT often plays only a subsidiary role.

The responses also suggest that COOs are more supportive of CIO strategic involvement than are CEOs and CFOs: One-quarter of all COOs surveyed called for extreme CIO involvement, versus only 15 percent of the CEOs and 13 percent of the CFOs. In fact, the study suggests that alliances between COOs and CIOs may be one of the important trends of the 1990s. "The COO appears to have discovered the value of IT," said Brzezinski. "The CFO was interested in owning IT for his power base, but the COO



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truly needs it to run the business, and to improve it. If I were going to pin my hat on the one executive that was going to be IT's champion in the coming years, it would be the COO."

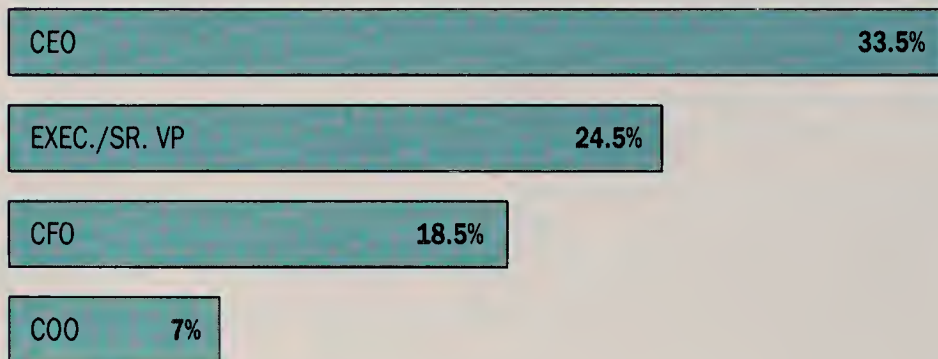
Still, reporting directly to the CEO remains the brass ring of information technology management, and is probably one of the best reflections of how high a priority IT is to a company. Thirty-four percent of the executives surveyed indicated that their CIOs report to the CEO, a higher percentage than for the top managers of sales, marketing, manufacturing, engineering or any other senior management position except for operations, finance and human resources. Furthermore, CIOs are more likely to report to the CEO than to any other title; 19 percent of the respondents said their top information executive reports to the CFO, 7 percent to the COO and 25 percent to an executive or senior vice president. That's an impressive accomplishment in its own right, insisted Bealmear.

"There are probably only about 5,000 people in the entire Fortune 500 capable of breaking into that elite circle and reporting di-

The high percentage of CIOs who report to someone in the executive circle, and the fact that so many of those report to the CEO, suggest that IT is a high priority in many companies.

The Majority of CIOs Report to Someone in the Inner Circle

Total = 83.5%



rectly to the CEO," he said. "It's a manager's overall skills that determine whether or not he or she ultimately breaks through, but the CIO may have more opportunity than most others."

All told, 84 percent of executives said their top information executives report to someone in the executive circle, whether it's the CEO, CFO, COO or executive or senior vice president. The number of CIOs that end up reporting to the CEO is likely to continue to grow, if slowly. Five percent of the CEOs surveyed said their CIOs would report to a

Dear CIO . . .

Wherein senior managers give their CIOs a piece of their minds

Respondents to the *CIO-Coopers & Lybrand* survey of non-IS senior managers were invited to offer—from the encouraging shelter of anonymity—whatever advice they thought would most profit their CIOs. The results ranged from the ridiculous (Lengthen the day "from 24 to 34 hours to get more work done") to the sublime ("Stay fit—take care of your health") to the downright terroristic ("Fire all the people who report to [you] and replace them with better people").

In keeping with the overall survey results, in which many respondents found CIOs lacking in communication skills, much of the verbatim advice stressed the need for effective advocacy of what IS has to offer.

"Communication is of the utmost importance. It builds understanding and credibility and openness to new ideas," said one respondent, who described the way his company's IS group communicates about technology as "mysterious." Another executive advised "improving the education of senior management" about the capabilities of technology. Still another commanded: "Sell the function!"

Given the overwhelming emphasis survey respondents placed on user satisfaction as the chief measure of IS success, it's not surprising that respondents urged a closer relationship between CIOs and internal cus-

new title next year; two-thirds of those who have made up their minds said the new report would be to the CEO.

Interestingly, 26 percent of the executives in companies with annual revenues of less than \$1 billion or greater than \$5 billion said they intend to change the CIO's reporting title, compared to only 12 percent of the executives at companies with revenues between \$1 billion and \$5 billion. That may reflect the fact that smaller companies find it easier to restructure their organizations while the largest companies face the greatest pressure to restructure.

tomers. "Listen carefully to . . . line management," said one. "They should be driving the information systems. If you are not serving your customers, you'd better be serving the people who *are* serving your customers." "That," said another, "is the secret of running IS—you've got to be in tune with the people who buy your services." And, finally: "The users know what they want"—hardly an article of faith in IS circles. But another executive saw his CIO's work with users as a collaboration rather than order-taking: "[He should] keep doing what he's been doing—to continue to help users carefully describe what they seek."

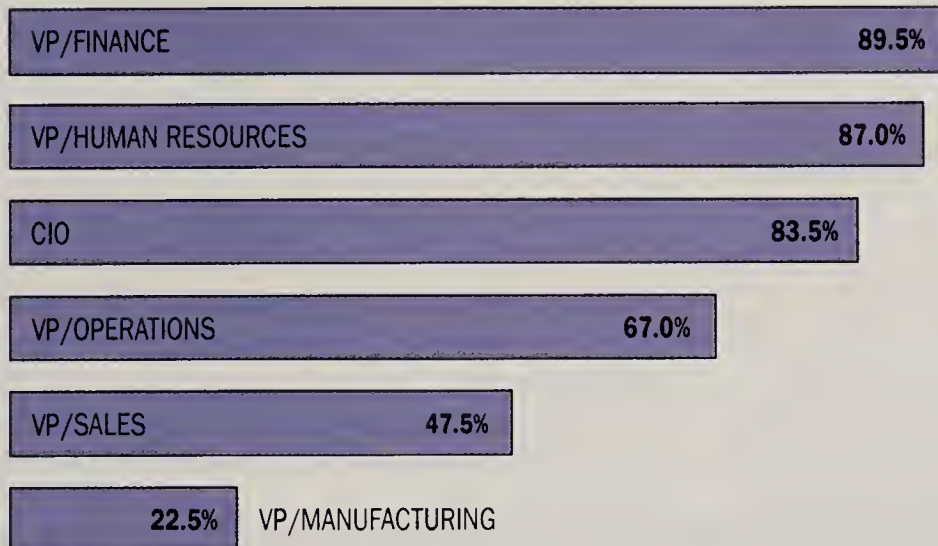
The twin concerns of cost-effectiveness and productivity were well-represented. "Get more for less money," said one. "We are paying a lot for our computers and not seeing much payback. . . . We should be able to operate with less personnel." Said another: "When budgets decrease, as they are [doing] now, quality shouldn't go down also." Still another called upon his CIO to "produce what you promise."

One respondent was concerned with CIO succession. "[He should] be developing subsequent management . . . and grooming his eventual replacement." Two others deemed succession irrelevant and advised the CIO to "look for a job"—in one case because of looming Chapter 11, in the other because the company was being acquired.

But a modest number of grateful bosses simply voted for the status quo. "Stay with the company," said one. "Keep up the good work," said three others. And, finally, some words of encouragement that might fairly summarize the survey as a whole: "Continue to persevere, [and don't] be distracted by different barriers."

On a disappointing note, significantly fewer executives said they would consider the CIO for a senior line-management position than said so in a similar study conducted last year (56 percent this year versus 68 percent last year). "The CIO wants to play a bigger role in business," said Brzezinski, "but the senior management team is saying, 'Come back later.'" Once again, COOs were the most supportive, with 70 percent saying they'd consider the CIO compared to only 53 percent of CEOs and 50 percent of CFOs. On the other hand, COOs draw the line at offer-

Who Else Reports to the Inner Circle?



ing CIOs their own jobs, or their bosses'—a mere 20 percent said they would consider the CIO for the position of COO or CEO, compared to 39 percent of CEOs.

But if executives aren't ready to promote CIOs, they do seem willing to listen to them: Twenty-seven percent said they interact with the CIO at least once a day, and 23 percent said they interact more this year than last (7 percent said they interact less). Manufacturing-company executives have less to say to their CIOs, however: Twenty-four percent of the executives at these organizations said they talk to the CIO less than once a month, compared to only 10 percent of the financial-services executives.

Not surprisingly, executives see the CIO as being most effective in IT's traditional target areas of increasing productivity and controlling costs (cited by 91 percent and 84 percent of executives, respectively). But, happily, executives also gave high rankings to CIO effectiveness in more exciting areas: Seventy-five percent said the CIO has helped create and sustain a business advantage; 80 percent listed improving management effectiveness and 67 percent cited restructuring business processes.

Financial-services-company executives are particularly pleased with the CIO's role in creating and sustaining business advantages, with 83 percent citing that accomplishment versus only 71 percent of manufacturing-company executives. Executives who said their companies were in a growth phase also listed business advantage more frequently than their counterparts in companies undergoing downsizing (79 percent to 68 percent).

Executives in the downsizing companies

Another healthy sign: More CIOs have breached the inner circle than any other senior management position except for finance and human resources.

Executives Want CIOs Who Are Well-Rounded

REQUIRED BACKGROUND	TOTAL	CEO	CFO	COO
IT	11.5%	10.8%	14.5%	8.0%
General Management	9.0	9.5	6.6	12.0
Both	78.0	78.4	78.9	76.0
Other	1.5	1.4	—	4.0

Non-IS executives agreed that a mixed background is desirable in CIO candidates; but COOs stood out in their emphasis on the importance of general management experience.

Executives aren't ready to promote CIOs, but they do seem willing to listen to them, as evidenced by the large number who reported interacting with the CIO at least once a day.

looked to the CIO for cost-cutting, with 94 percent citing that as an area of effectiveness, versus 83 percent of executives at growth-phase companies.

Where do CIOs fall short? Apparently in communicating: Forty-one percent of all executives said that CIOs have failed to help others in the organization understand what IT is all about. But that's not really fair, according to Bealmear; there may indeed be a lack of understanding in the organization, but it's not primarily the CIO's fault. "The CIO has spent years learning the business," he noted, "but users haven't made an effort to understand the technology. There hasn't been any reverse outreach. It's as if now that the CIO has done everything they've asked of him or her, they're throwing out a new hoop to jump through: communicating."

Cited by a mere 12 percent of the executives as a barrier to success for CIOs was a lack of credibility. That figure is noteworthy considering that in a Coopers & Lybrand survey of CIOs conducted last year, fully 73 percent thought their lack of credibility was a major problem. "It seems as if other managers have a higher opinion of CIOs than CIOs do of

themselves," said Brzezinski. Twenty-seven percent of those surveyed said that CIOs could best improve their contributions to the organization by increasing the focus on users. Twelve percent thought the CIO needed to improve efforts on technology issues and one-third had no recommendations at all (other than "keep up the good work"—checked off by half of those).

Measuring the CIO's effectiveness is always a sticky issue. At least that's the conventional wisdom; the executives surveyed seemed to have no trouble identifying the correct yardstick for IT. Fully 94 percent said that user satisfaction was a key consideration; 79 percent cited project financial justification; 67 percent mentioned overall re-

"The CIO has spent years learning the business but users haven't made an effort to understand the technology. There hasn't been any reverse outreach. It's as if now that the CIO has done everything they've asked of him or her, they're throwing out a new hoop to jump through: communicating."

—Michael Bealmear

Frequency of Interaction with the CIO

	TOTAL	CEO	CFO	COO
1/Day	26.2%	25.7%	28.9%	24.0%
3-4/Week	4.2	6.8	3.9	2.0
2-3/Week	14.5	20.3	13.2	10.0
1/Week	22.0	20.3	23.7	22.0
2-3/Month	7.8	6.8	6.6	10.0
1/Month or Less	19.8	17.6	15.8	26.0
Never	1.1	1.4	—	2.0
All Other	4.4	1.1	7.9	4.0

turn-on-investment and 60 percent said simply "gut feel." (Noted Brzezinski: "It's a little odd that the people that IT is supposed to be satisfying are the same people who don't understand IT.") Surprisingly, CFOs preferred gut feel to ROI 72 percent to 57 percent; for COOs the figures were 74 percent to 42 percent in favor of ROI. Maybe CFOs have just

"The CIO wants to play a bigger role in business, but the senior management team is saying, 'Come back later.'"

—Ronald Brzezinski

thrown in the towel after all these years of trying to calculate IT's bottom line. "The COO needs day-to-day proof," said Brzezinski. Good luck.

CIOs must be doing something right, though, if compensation is any indication—especially at financial-services organizations. Thirty-eight percent of executives at these companies said their CIOs earn more than other managers reporting to the same title, and only 6 percent said they earn less. At manufacturing companies, in contrast, the numbers earning less or more are evenly split at about 17 percent. Whom should a CIO report to if he or she wants the greatest compensation? It's not the CEO, according to these executives, but rather the COO. Twenty-nine percent of executives said CIOs reporting to the COO made more than managers reporting to other executive titles, while only 21 percent said CEO reports earned more, and a mere 14 percent said those reporting to the CFO made more.

Given executives' emphasis on user satisfaction and ambivalence toward the CIO's role in strategy formulation, one might expect them to value the ability to communicate to users above the knack for strategic thinking. But the opposite is true: In picking the characteristics they'd most like to see in a CIO, executives listed strategic vision well ahead of communications skills. In fact, it was the top-cited characteristic of the six offered on the survey, followed by management skills, communications skills, technical skills, business acumen (surprisingly low-rated) and overall experience. Bealmear suspects a touch of disingenuousness in these responses. "They rank strategic vision number one," he noted, "and yet they still list cutting costs and raising productivity as the areas of the CIO's greatest effectiveness."

Once again, COOs were the most comfortable with the idea of CIOs playing a strategic role. Sixty percent of COOs picked strategic vision as the most important characteristic, compared to only 45 percent of the CEOs. And while CEOs ranked technical skills third, COOs placed it fifth. (CFOs ended up between the two on these issues.) COOs also stood out on the subject of general management versus IT backgrounds for CIOs. Most executives said they look for both, but of those who preferred one, 60 percent of the COOs chose general management compared to only 30 percent of the CFOs (CEOs were evenly split). "Most executives are still intimi-

Methods of Measuring IT Effectiveness Are Still More Art than Science

(Respondents were not restricted to one answer)

METHOD	TOTAL	CEO	CFO	COO
User Satisfaction	93.5%	94.6%	94.7%	90.0%
Financial Justification of Each Project	79.0	81.1	75.0	82.0
Overall Return on Investment	66.5	71.6	56.6	74.0
Gut Feel	60.5	60.8	72.4	42.0
Projects Selected to Stay Even with Competitors	62.0	64.9	60.5	60.0

dated by technology and feel they need a technologist to manage it," Brzezinski pointed out.

For better or for worse, executives are counting on their CIOs to stick with the company. A solid 84 percent of executives said they believe their CIO will make a career at the company—in stark contrast to the CIO's reputation as a transient. "This is one more sign that the CIO has gained credibility," said Bealmear. "Everyone used to say the CIO has a half-life of three-and-a-half years, which made CIOs nervous as a cat on a hot tin roof."

Clearly, CIOs can relax. Unless, that is, they're still holding out for the opportunity to sit alongside senior executives in corporate strategy sessions. ☐

David Freedman is a freelance writer based in Brookline, Mass.

Conventional wisdom says that measuring the CIO's effectiveness is a sticky issue. But the executives surveyed seemed to have no trouble identifying the correct yardstick for IT: user satisfaction.



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THE ONCE AND FUTURE CIO

The CIO job description of tomorrow looks a lot like today's ideal. Although only a relative handful of CIOs are now living out that ideal, today's exceptions will likely become tomorrow's rule.

BY THOMAS KIELY

What will the CIO of tomorrow look like? A number of experts predict that as the millennium draws to a close, the CIO will be part of a corporation's top management. He or she will thoroughly understand the business of the company and take a leadership role in utilizing technology to enhance competitiveness. In the years to come, the CIO will have the clout to change business processes, reshape the organization and help write the corporation's strategic destiny.

But wait—this is the CIO of the future? Hasn't most of this—if not all of it—been part of the CIO's job description all along?

PATRICIA BARRON has ambitious plans for making IS more visible. "I can make myself felt when I need to be felt."





"We've got a complete SAA system up and running, and it's hard to say who's happiest: our programmers, our users, our customers, or me."

Keith Sievers, VP/Information Systems and Treasurer,
Federal Kemper Insurance Company

Federal Kemper Insurance Company is a home and auto insurer who's found some insurance for themselves, against system obsolescence.

It's a policy called SAA,[™] or IBM Systems Application Architecture.[™]

Their SAA system is a client-server approach that ties IBM PS/2[®]s running OS/2[®] (in remote locations and the home office) with an ES/3090[™] host. They chose SAA for both short- and long-term advantage.

"In our business," says Keith Sievers, "there's a tremendous need to cut costs, to make everybody as useful as possible. SAA is helping us do that. We also need a platform that's consistent, easy to manage, and built for growth. For us, going with SAA was just the obvious thing to do."

For programmers.

The first people to notice an improvement were FKI's programmers.

"We did everything in COBOL, but in the Presentation Manager[™] environment," says Keith. "All of a sudden, people who'd been here for years were driving to work a little faster. They were doing better work, they were making a difference, and they saw results quickly, even without CASE tools."

FKI now has applications for data, image and customer service that are easy to use and easily portable. And they're delivering more function to users at less cost, thanks to SAA's cooperative processing.

Says Keith, "Under SAA, we're moving a lot of our processing from the mainframe to PCs, which offer flexibility and portability. And we see real benefits from a disaster recovery standpoint."

For users.

And do users like it?

"They ought to," says Mr. Sievers, "they helped us design it. SAA screens are sort of a personal thing, so it only made sense to include the people who'd be using them every day. Our old screens had acronyms tucked into every available space. The new ones are a lot easier to look at and understand, and everybody loves the mouse. It's less like work and more like fun."

And while multitasking doesn't mean much to the public, it's going to be a real plus for FKI's customers.

For customers.

"When policyholders call with questions, they want answers fast. And when our SAA system is fully implemented, they'll get them. Our representatives will be able to solve problems on the spot just by popping a new window onto the screen. Instead of 'I'll get back to you later,' they'll say 'Here's the answer right now.'"

Keith Sievers has other reasons for liking SAA, especially since MIS isn't his only job. He's also the company treasurer.

"We wanted a leading-edge system that would still be leading-edge five years from now, a base we could build on, something we could enhance with AI, voice or image technology, but without having to toss out what we already owned. People ask questions about SAA, but of all the options we explored it was easily the *least* questionable.

"We're very competitive, and the truth is, only two things separate insurance companies—cost and service. SAA gives us an edge both ways."



Well, yes, conceded several management and technology gurus. (Some of their comments accompany this article.) Like the old joke about some leading-edge technologies—"it is the wave of the future, and always will be"—the concept of the CIO has been widely touted, but rarely embraced. In practice, said John Diebold, chairman of The Diebold Group Inc., a New York-based management consulting firm, "the CIO has primarily represented a change of title rather than a change in functions. The CIO of today is yesterday's vice president of IS," not the broad-gauge information executive of tomorrow.

The eagerly anticipated evolution of the superstar CIO is still more fancy than fact, Diebold said, in part because of the caution of corporations, too many of which pay little more

Moreover, despite the broad consensus about the importance of information technology as a strategic resource, there is considerable debate over the exact dimensions of the CIO's future role as IT's custodian. Will the CIO become the corporation's resident visionary, or a manager charged with implementing someone else's visions? Who will the CIO report to? Will management of information technology remain a specialized realm, or will it become part of the general management portfolio? How will IS be organized within the corporation?

J Bruce Harreld, senior vice president and CIO of Kraft General Foods Inc., in Glenview, Ill., embodies one version of the future. Harreld is a member of Kraft's top management team, governs the corporation's myriad IS resources, acts as point man for an ambitious program to re-engineer the corporation's core business processes and technology systems—and arrived in his present job with no prior experience in IS. Before becoming Kraft's CIO in 1987, Harreld was a strategic planner (and would argue that he still is), not an IS hotshot who rose through the technology ranks.

He was tapped for his job following what he described as "a breakdown in communication and understanding" between Kraft's conventionally structured IS organization and senior management. IS managers "were using words we didn't understand," Harreld said. "... We found ourselves out of touch with what [IS] was doing.

"I think what really hit us in the face was that at one point, the systems organization viewed its performance as pretty good," Harreld reflected, "yet we in senior management viewed the organization's [overall] performance as pretty mediocre, if not disastrous."

Kraft's chairman and senior managers wanted to create a new role for IS at the company, Harreld said—something more critical, more dramatic, more visible. "We weren't

PROSPECTS

SHOSHANA ZUBOFF

*Author of In the Age of the Smart Machine and Associate Professor
Harvard Business School*

The CIO is an adaptation with a limited niche. I'd like to think that what we're going to evolve toward will look more like general managers. Organizations need general managers who understand the innovations that technology will enable. This is not a matter of saying that if we learn how to use the technology we don't need the CIO. Rather, technology has in it explosive implications about how we organize ourselves. As long as we keep technology in a box, in a function, separated from other functions and concerns, its strategic benefits are not going to materialize in a way that is regular, sustainable and integrated into the real life of the business. I think part of the problem is the functionalization of domains—including [that of] the CIO. [Technology will be strategic] when people in the field know how to leverage information to create value and have the environment to be able to do so. I just don't think it's in the cards for most CIOs to understand how critical this is.

than lip service to the notion "that information is critical to their success."

But IS managers also must shoulder some of the blame, Diebold added. Too few have developed the skills, the knowledge and the organizational clout to wear the CIO mantle. A number of experts (and a few CIOs) now believe that if titular CIOs do not soon transcend their inadequacies, they may not have much of a future.



J. BRUCE HARRELD: Kraft's CIO was a strategic planner, not an IS hotshot.

sure why," he said; "we just felt that was right." When Kraft's chairman asked him to accept the newly created CIO position, Harreld was at first reluctant. "It wasn't my idea of a successful career [move]."

He doesn't feel that way now. "I believe [being a CIO] is a journey, not a destiny," Harreld said. "We're not just writing code in new applications. What we're really doing is assisting as full partners in changing the way the company does business."

Kraft's decision to install Harreld in the CIO position raises an issue that conventional IS managers can no longer ignore. Kraft believed that Harreld's management skills, enterprisewide vision and organizational pull were important assets that outweighed his lack of technical expertise. Technology can be delegated, as several experts and CIOs put it—usually to MIS types who are stuck on the technical career track.

While it has been true for several years now that the CIO must be a centaur—part IS horse, galloping beside the fast-paced changes in technology, but from the waist up a savvy general manager—the future will bring increased pressure on IS managers to broaden their horizons, or else be replaced by CIOs appointed from elsewhere within the company, or from outside.

In fact, according to a recent study, most CIOs possess significant non-IS management experience. In their study of CIOs at large and mid-sized organizations, Harvard Business School Professor Lynda M. Applegate and Joyce Elam, a professor at Florida International University, found that 70 percent of the CIOs surveyed had five or more years' experience (within the last 15 years) managing a business function or a

PROSPECTS

THOMAS J. FRIEL

*Managing Partner of the Information Technology Practice
Heidrick and Struggles Inc.*

I think the future of this position is very bright. Most major companies will have a CIO who is a key member of the executive [committee]. There are excellent opportunities for women in this profession. You'll see the amalgamation under this title of virtually all the centralized technology resources of the company: telecommunications, networking, messaging and so on, in addition to processing. I think in some cases the job of the CIO will expand beyond that of IS and telecommunications and may pick up some other things—as a way to broaden the job, and to offer really strong individuals [an incentive] to take these positions. One way to do this—it's happening already—is [to create] IS as a P&L [profit and loss unit] within the company structure. This may involve selling internal services on the inside, or on the outside. If you look at the major banks, for example, virtually all of them have taken their historic IS function and created it as a subsidiary.

PROSPECTS

TOM PETERS

Author of Thriving on Chaos and In Search of Excellence

A lot of CIOs are simply MIS vice presidents with enhanced titles who have about as much imagination as a turtle walking down the street. The successful CIO of the future will be someone with a bold and wacky idea, someone who is a leader rather than an administrator or a manager—someone who can get lots of other people fired up—and who has the ability to listen, and to literally let the people in the field buy into [the idea] in their own fashion. We are literally re-inventing businesses, industries, relationships among people within companies and the way companies are mixed and matched, and that begs for a CIO with a clinical psychology degree. I think you get your practical business clinical psychology degree by hanging out with real people close to the action. Too many of today's CIOs have come up through the ranks of the MIS bureaucracy, and their touch with the real world is not all that it should be. The point is that the job is much too important to have a czar other than the chairman or the president. I think the CIO has a phenomenally important role as an architect, as a facilitator, but not as God.



THOMAS PETTIBONE: *The IS organization will reject a non-technical CIO "like a bug."*

business unit other than information systems. Of these, more than half also had five or more years of experience managing IS (37 percent of the total), but 33 percent of the total were straight business types. Only 30 percent of the CIOs surveyed rose solely through the IS ranks.

The phenomenon of non-technical CIOs disquiets many who believe that IS issues are too specialized for the generalist. Thomas Pettibone, senior vice president of information systems at New York Life Insurance Co., bristles at the suggestion that the future belongs to the Harrelds. While he readily admits that "business issues are the things that pull everything forward" in the CIO profession today, Pettibone was adamant that a thorough understanding of technology is an equally critical skill for the CIO—and that means the CIO should come up through the IS side of the company, as Pettibone

has. He dismisses the non-technical CIO, hired from outside the company, as a "kamikaze pilot. . . . Number one, he doesn't know the company, and number two, he doesn't have any credibility with the people in the organization. They will reject him like a bug."

Amen to that, said Bruce J. Rogow, executive vice president for worldwide analytic resources at the Gartner Group Inc. in Stamford, Conn. "I don't want to diminish the importance [for a CIO] of understanding the business," he said. But technology is key to their positions, and a thorough understanding of technology will be critical in the fast-paced years ahead. "When I talk about technology to my CIO friends," Rogow added, "they look at me as though I were a member of the Manson family. My gosh, they've got to spend more time on this stuff."

Even Harreld believes that CIOs

ought to come from the IS side of the company. He said that his ascension to the title is "an indictment" of Kraft's senior management—himself included—which had long managed functional areas as separate-but-equal fiefdoms. Kraft discovered that "when we get ready to have senior people on top of each of these functions, we're expecting them to be broader than their functions alone, and they've never had the training." This deficiency was particularly acute in IS, he said. Harreld now insists that one of his most important responsibilities is to grow a few full-fledged CIOs in Kraft's IS organization.

He isn't alone. Harvard's Applegate points out that there is a trend in companies to "rotate" promising IS executives through business positions, or business managers through IS. "There is a push on the part of senior managers to get people who are really well-versed in both areas," Applegate said. "[They] recognize the importance of experience in both areas." In a sense, a few companies are growing their own CIOs—and woe to those one-dimensional IS managers they replace.

For the unenlightened it will only get worse. Tomorrow's companies will need CIOs who have more than a basic understanding of business, according to Thomas J. Friel, managing partner of the information technology practice at Heidrick and Struggles Inc., in Menlo Park, Calif. The future CIO will need to "deal very comfortably with finance, marketing and operational issues, in addition to technology. They will do partnerships, operate globally and [will be] comfortable being visible in public, which means communication skills, speaking skills, probably writing skills, presentation skills."

If that weren't enough pressure, changes in the technology will also push IS executives either up the ladder (if they gain the necessary skills) or out the door, according to Larry Marzullo, vice president and CIO of The Bekins Co., the Glendale, Calif.-based freight-transportation outfit. Factors like outsourcing and the pro-

liferation of PCs are rapidly transforming all technology "into a commodity," Marzullo argued. The large data center—once the kingdom of IS managers and their legions of programmers—will serve as little more than a data repository. In the 1990s, more organizations will become flatter, shedding layers of middle managers, he said. Customer service will

PROSPECTS

BRUCE J. ROGOW

*Executive Vice President for Worldwide Analytic Resources
Gartner Group Inc.*

What should CIOs do now to prepare for the future? Four things, I think. CIOs should get back into the strategy of technological gaming. That isn't just attending seminars to learn about [new technologies]. It means doing some gaming in your company to see what the impact of [technology decisions] will be and what the costs will be. Second, I really think CIOs have got to get their management ready for an extremely unpredictable period of time in technology during the next five years. Third, they have to demystify the CIO position. So many companies have been sold [the notion] that the CIO will solve all problems, that the level of expectation [for this position] is too high. Lastly, CIOs today may be far more businesslike than they were five years ago, but I'm not so sure they've crossed the cultural barrier into general management. There's a cultural barrier that has to be overcome.

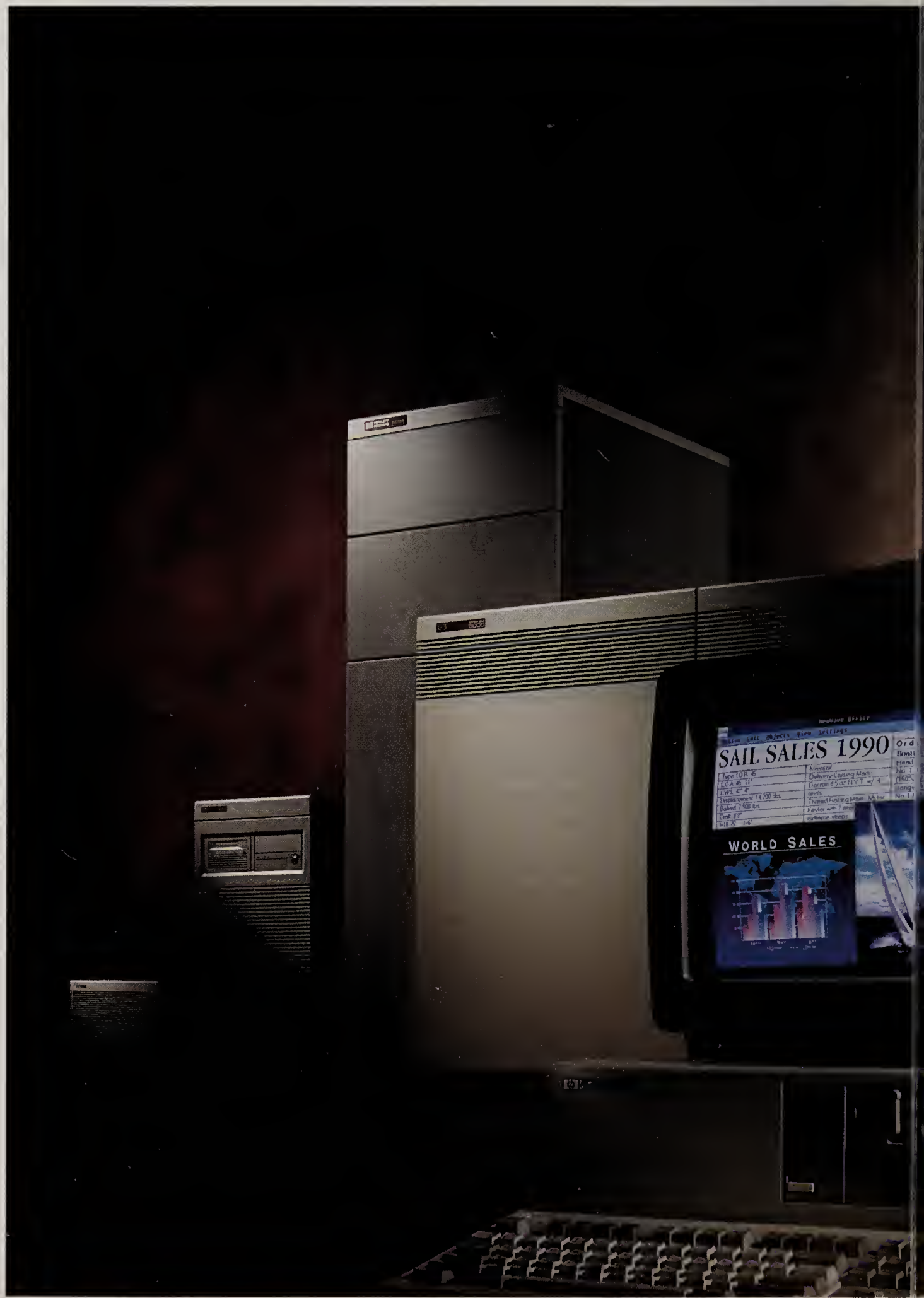
provide the competitive edge in the next decade. Information technology will be a critical tool for delivering service, but the technology will be distributed, and the physical systems themselves will be shopped out, or delegated to technical subordinates.

Marzullo embodies the multi-faceted CIO best-suited to manage the IS operation of his predictions. A member of the Bekins board and part of the company's strategic-planning team, he is involved in nearly every facet of his business. "I might be involved in transportation issues," he said. "I might be involved in claims issues and insur-



LARRY MARZULLO: *Technologists' days are numbered.*

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PROSPECTS

F. WARREN McFARLAN

*Ross Graham Walker Professor of
Business Administration
Harvard Business School*

We will find many more CIOs with substantial general management experience as well as IT experience. It's going to be very hard for the CIO to be the best technologist in all details. When running a large operation, almost by definition [the CIO] must move away from the issues at the cutting edge. We're going to need [talented technologists] for as far as we can see into the future. But those people are going to have an entirely different set of skills and career paths than people actually responsible for making things happen inside the organization. Where will the CIOs of the future gain management experience? Out working where the real rubber meets the road in the company. It may be in the factory, it may be the marketing organization—not in staff jobs, but out where you bleed—so that you get a much cleaner feeling as to exactly how technology impacts in an environment, where it doesn't work well, what the implications of that are.



PETER MATHER: *playing a pivotal role in his company's re-engineering program*

ance issues and legal issues. In our company, there is not a major decision made that is not somehow related to information systems."

Marzullo believes that the CIO of the future will become indistinguishable from other members of upper management. The CIO who remains largely a technologist will be left behind as time rolls on, he said. "If you can carve out [a senior management] role, you'll succeed. If you can't, you'll be a dinosaur."

That isn't the way Mark Wilberts sees it. Wilberts, who is vice president of information systems at Land O'Lakes Inc. in Arden Hills, Minn., believes there will be various flavors of CIOs in the years to come. One of those flavors will be his. At Land O'Lakes, Wilberts manages a core of corporate information services and has dotted-line connec-

tions to other IS groups in the corporation's decentralized business units. He reports to the CFO.

That's the way the CIO position works best at his company, he said. In industries like banking or insurance, where information technology itself is the business, the CIO may become part of upper management. But in industries where IS is a tool and not an end, the CIO probably won't gain that kind of prestige. Wilberts—an IS veteran—got his job just last spring, when Land O'Lakes picked him over two other candidates, both of whom had business experience. Still, Wilberts thinks that "from our company's perspective, the information executive will continue to grow in value and stature and be included in strategic planning."

But others say they see the handwriting on the wall and intend to take Marzullo's advice. Perched atop their companies' IS organizations, they are

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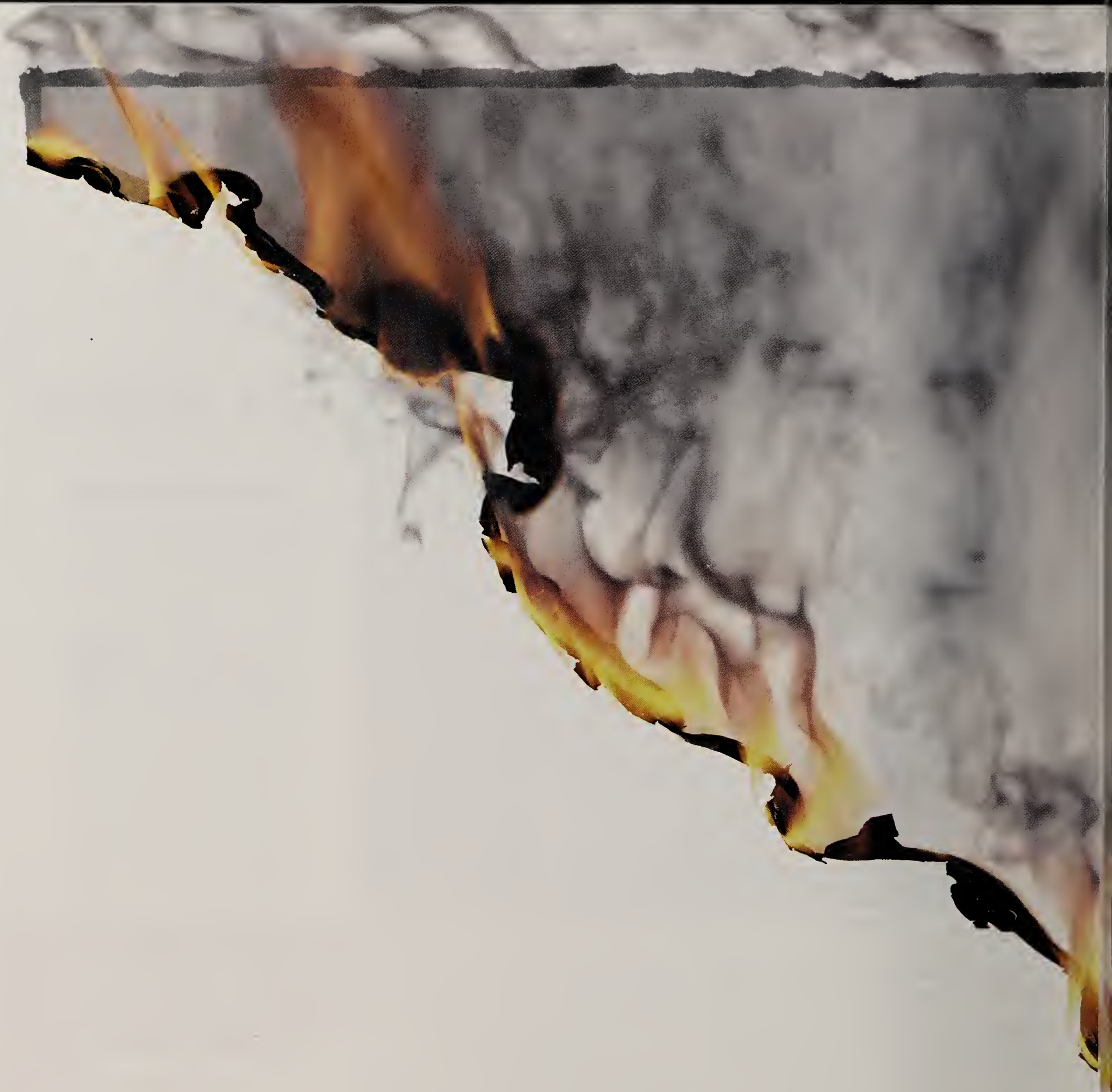
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toiling to expand their positions, their visibility and their organizational roles, in order to carve out a place for themselves in the future.

Patricia Barron, vice president for corporate information management at Xerox Corp., in Stamford, Conn., reports to an executive vice president in the company and sits with upper management. "I'm not in all the councils that, perhaps, I'd like to be," she said, "but I can make myself felt when I need to be felt."

Information systems is already important at Xerox, but Barron believes her group could—and should—take

question of making the [CIO] job larger for its own sake," Barron asserted. "This is not an ego trip here. This is a question of: Are you playing your full role in terms of what you can bring to the table? Are you making contributions to the business just by what you bring to the table?"

Peter Mather, vice president of management information services at Air Products and Chemicals Inc., in Allentown, Pa., isn't waiting passively for the future. Mather manages large corporate systems and has been engaged in a project to "distribute" IS to the corporation's three operating units. He envisions a time when information systems will extend beyond the operating units to the company's customers themselves. "What we're creating is a level of complexity we've not dealt with before, in terms of the inner data, computer architecture and telecommunications infrastructure," he said.

Most recently, Air Products kicked off a major re-engineering program and assigned Mather to a pivotal role in it. The company has begun to restructure one of its operating groups, and Mather is buoyant about the effort. "The kinds of changes that might be brought about don't necessarily have to be driven by computer-based technology. But they can be discovered by people who have good process-orientation skills. That's a skill set MIS has, and we're bringing it to bear."

Last August, Mather was named to Air Products' management committee. In the months ahead, he expects to lead the company forward in establishing alliances with major customers, and to help restructure its global strategies. "We have an IS [organization] in Europe, but we're going to move toward a worldwide view of business and really explore where to conduct certain activities, whether they be computer activities or business activities."

Perhaps the age of the honest-to-god CIO is still largely in the future. But some modern-day CIOs are making their futures now. 

PROSPECTS

JOHN DIEBOLD

Chairman

The Diebold Group Inc.

I think the role of the CIO is to be constantly concerned with how things will be changing. The CIO will need to develop an entrepreneurial feeling for the business. The CIO ought to have a sense of what's involved if [the company] could do [a business process] very differently—if you could deal at home with customers, let's say. The CIO has to understand what's happening technologically, particularly in the future—what the problems are, what the limitations are, what's likely to be going on—and not to get carried away with assuming that because something is technologically possible in the laboratory that it is necessarily going to be useful. But they are not going to be able to do their job if they can't think through the essence of the business from an entrepreneurial standpoint and decide how to organize it in a completely different manner. No one is better suited in the organization for doing that than the CIO.

on bigger responsibilities. "We're not without our impact," Barron said. "But there's a stronger role [we could play]." The first step, she said, is simply pushing forward and doing a good job. For example, Barron's department developed a document-storage-and-retrieval system for an in-house customer; it has now spun off into a marketable Xerox product. That brought some visibility to her department. Beginning next year, Barron will also take a lead role in an ambitious corporate re-engineering project. She is convinced that IS can be key to making Xerox a more efficient organization.

As the IS department expands, so too does the CIO role. "It's not a

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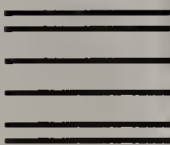
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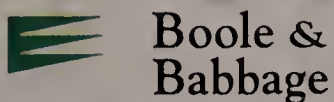




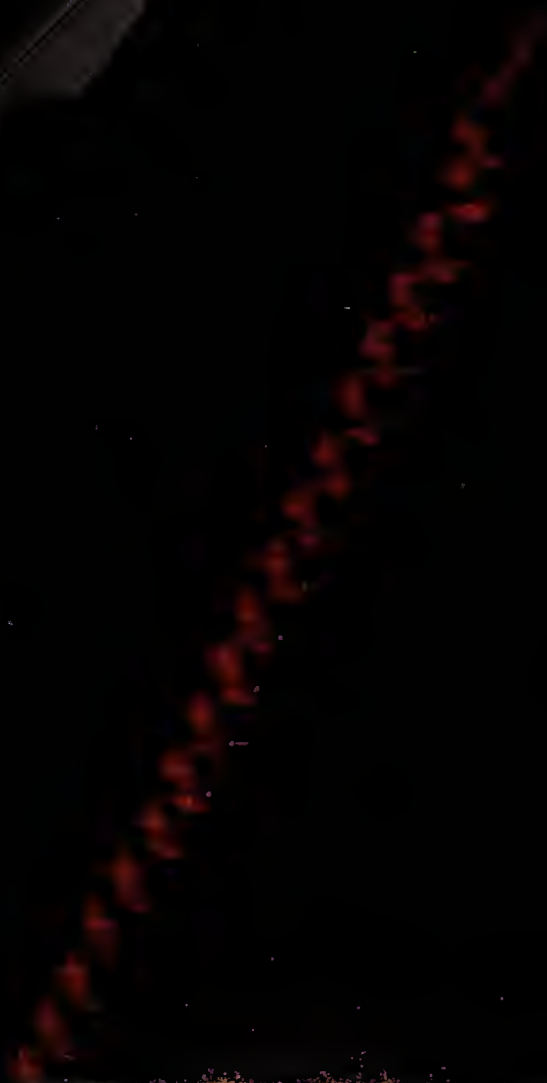
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Automated telemarketing services are helping companies reduce sales costs, heighten productivity and foster customer goodwill

GETTING A LINE ON TELEMARKETING

BY LESLIE GOFF

Telemarketing is often associated with the annoying call during dinner in which an anonymous operator offers you an exclusive Las Vegas vacation for just \$99.95 if you'll pay with your credit card now. However, as customer service becomes the hallmark by which competitive edge is measured, companies in nearly every industry are evaluating or implementing automated telemarketing systems to make it easier for their customers to place orders, make inquiries and solve problems. ☎ In fact, according to Richard Brock, chairman of Brock Control Systems, an Atlanta-based telemarketing software provider, outbound business-to-consumer sales account for only about 20 percent of all phone-based business transactions. More common are business-to-business sales and prospecting, inbound order entry and customer service. ☎ For most companies, the bottom line is that automated telemarketing systems are reducing their labor and sales costs, increasing their productivity and enabling them to collect comprehensive data about their customer base and their own internal

PHOTOGRAPHS BY DANA SIGALL



*Doubt has an office. Anxiety has a key to the washroom.
a lunch date with Paranoia. And me, I'm staring at my
consistently as the tides. And just as I'm doing this my
be passing by my office at this time, I say, "Blame, you
thousands of AT&T workers reminding me that buying
And as the phone rings again I say, "Blame, this system
It's ready to grow like flowers in springtime and is
But Blame didn't hear this last part, as he was down the
well though, it was Advancement on the phone asking*

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*Insecurity has a stack of messages from Ambition and
telephone celebrating the fact that our PBX works as
phone rings, and I say to Blame, who just happens to
know what that ring is? That ring is a chorus of
their DEFINITY[®] System was a peerless decision...."
has the highest residual value in the industry.
supported by a maintenance program unequaled...."
ball looking for some other doorway to darken. Just as
me if I had lunch plans.*

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operations (see related stories).

Such benefits cannot be overvalued when field-sales costs are skyrocketing to as high as \$600 per call in the capital-goods markets, according to Ross Hunt, manager of Corporate Network Operations, a strategic alliance between Hewlett-Packard Co. and Northern Telecom based in Santa Clara, Calif. Selling by telephone, whether it is outbound or inbound, to

For most companies, the bottom line is that automated telemarketing systems are reducing labor and sales costs, increasing productivity and enabling them to collect comprehensive data about their customer base and their own internal operations.

businesses or consumers, can lower costs by eliminating three out of four field-sales visits, according to Hunt and others.

In 1989 alone, said Hunt, \$201 billion worth of goods and services were sold over the telephone. "What that really says is that CIOs are interested in taking the basic tools they already have and applying them to other business functions in the company," he said. "The phone system is becoming an extension of the LAN."

Most users and vendors, trying to disassociate themselves from the more high-profile intrusive phone sales operations, shy away from the term "telemarketing," preferring instead words like "telesales," "tele-

The Value-Added ACD

.....

Travelers' automatic call distributor not only speeds call routing; its monitoring capabilities help to measure performance as well

The Travelers Companies, in Hartford, Conn., has seen a 30 percent productivity increase in its customer-service operations from the use of automatic call distributor (ACD) software, which intercepts calls and automatically routes them to the next available representative.

Using a combination of audio response units and the ACD embedded in AT&T's Definity Communications System, the company's 60 customer-service locations handle 200,000 calls per day from policyholders inquiring about claims and coverage.

Gus Bender, second vice president for telecommunications, said the audio response units handle about 35 percent of all incoming customer-service calls. The customer can switch to a live operator, but "many people who call in would rather talk to a machine," Bender said. "We're able to give more flexible customer service, 24 hours a day, seven days a week."

The biggest benefit has come from the information that the ACD collects on the call center's performance, Bender said. The ACD generates daily and weekly reports on such operational concerns as the number of calls handled in a day by agent or group of agents; the average length of each call; how long callers were in the queue; and the number of calls in the queue at any given time. "We can monitor and measure our performance right down to each company we insure, and we can staff accordingly," Bender said.

Customer-service supervisors can call up real-time screens to monitor the performance of a specific phone representative or unit. "From that we can tell whether our CSRs [customer service representatives] need more training," Bender said. The ACD also monitors the voice lines coming into the company to see if calls are being blocked by non-working lines, and it can alert the supervisor to line static.

This year, Travelers will add automatic number identification (ANI) capabilities, so that a customer's file can be retrieved and transferred simultaneously with the call to the customer-service rep.

Speech-synthesis technology will be implemented as well, to enable customers to get more information without speaking to a live rep. For instance, speech synthesis can provide the names and phone numbers of doctors specializing in specific areas. And by 1993, the insurer will install speech-recognition technology that will allow customers to communicate with the company without a touch-tone phone.

—L. Goff



Ring in Sales

A provider of warranty contracts expects its new call-processing server to help it increase sales and speed service to customers

American Home Shield Corp., a provider of service-warranty contracts for home support systems (plumbing, electrical) and appliances, recently began using automatic number identification (ANI) to boost the productivity of its inbound sales department. The company plans to expand its use of ANI and to add dialed-number identification service (DNIS) capability in incremental phases over the next year.

"Right now we generate 200,000 new contracts each year," said William Throckmorton, manager of telemarketing services at the company's Carroll, Iowa, service center. "We're emphasizing doing everything by phone."

The ANI and DNIS features are part of Hewlett-Packard Co.'s Applied Computerized Telephony (ACT) call-processing server, an interface that connects the HP 3000 and 9000 host computers with Northern Telecom's Meridian SL-1 PBX. Northern and HP are offering integrated PBX-to-host systems for telemarketing applications through Corporate Network Operations, their joint venture based in Santa Clara, Calif.

ANI identifies the number a customer is calling from and sends a message to the host computer to retrieve that customer's file. The file and the call are transferred simultaneously to a phone representative. DNIS identifies the specific 800- number the caller has dialed (a company may have different numbers for various departments or geographic areas all coming into the same switch) and routes the call to the appropriate department.

American Home Shield is currently using the ACT system in its inbound sales division, which takes warranty orders from real-estate professionals on behalf of homeowners. Over the next year, the company will migrate the system to other departments—initially to its 24-hour customer-service department, which takes calls from homeowners and connects them with the appropriate contractors for repairs covered in their contract.

After customer service, Throckmorton said, ACT will be implemented in the authorization department, which deals with contractors whose repair or replacement estimates exceed \$100.

Finally, the company will use ACT in its customer-relations department, which handles major problems and upset customers. "This is a key part of the business," Throckmorton said. "The customer who is calling is already stressed out, so the quicker we can solve their problem, the better. With ANI we get the history of the customer immediately. Our goal is to make the process the easiest for the customer. We want to exceed their expectations."

—L. Goff



computing" or "teleservicing."

"To lots of customers, telemarketing is a dirty word," said Pat Shafer, product manager for call centers with AT&T in Bridgewater, N.J. Shafer believes the industry should coin a new term to refer to the broad range of applications in use. On the other hand, "telemarketing is what it is," said Gilbert Cargill, president of The IDK Group Inc., a sales training firm in Los Angeles. "Looking for an alternative term is just rebelling against boiler-room operations."

The newest wave in telemarketing systems involves linking the telephone system to a host computer via a PBX. These links provide such capabilities as automatic number identification (ANI) and dialed-number identification service (DNIS) (see related story, this page).

ANI enables companies to identify

"CIOs are interested in taking the basic tools they already have and applying them to other business functions in the company. The phone system is becoming an extension of the LAN."

—Ross Hunt

the number a customer is calling from and to retrieve that customer's file before a representative even answers the phone. DNIS identifies which of an organization's 800- numbers the caller has dialed and routes the call to the appropriate department. These services are changing the way companies interact with their customer base by providing faster, more personalized service. The re-

Presenting All The Sy Software You'll

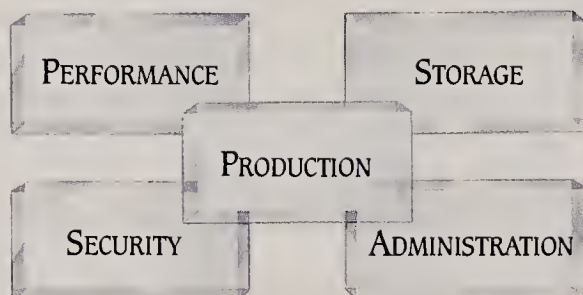
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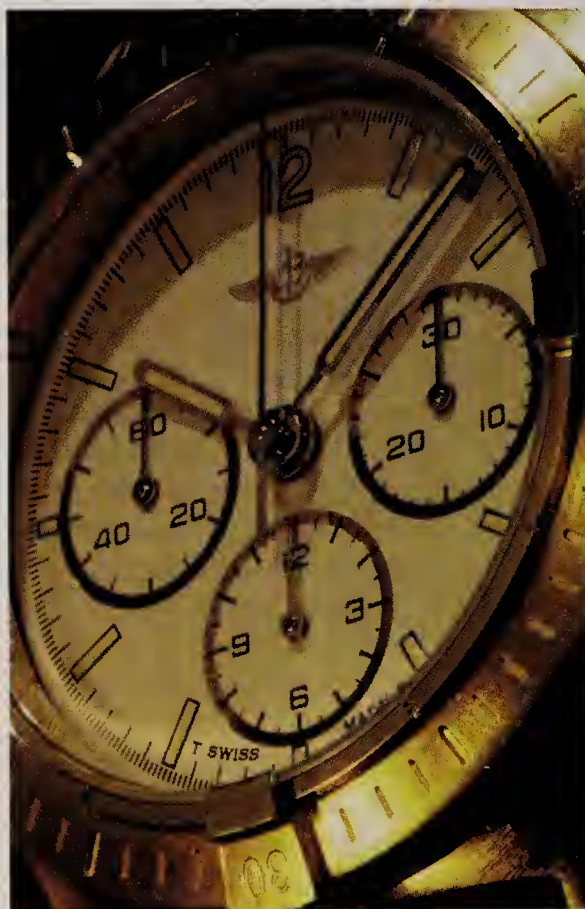
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sults are increased productivity among phone reps and an improved company image in the customers' eyes.

Other key technologies are automatic call distributors (ACDs), telemarketing management software and predictive dialers. An ACD, which is software embedded in a switch, can be used to route calls to the first available operator without having PBX-to-host links (see related story, Page 64).

ANI and DNIS are providing customers with faster, more personalized service, increasing productivity among phone representatives and improving the company image in customers' eyes.

Telemarketing management software keeps detailed records of each transaction with the customer. This gives the phone rep the ability to service the customer in a more personalized way and provides companies with a wealth of marketing data pertaining to regional and individual buying patterns, shifts in consumer tastes and more. In customer-service applications, the data collected by this software can be extracted to identify recurring problems with the same product or to improve product documentation by analyzing what questions are asked most frequently.

Predictive dialers are stirring up controversy in the outbound consumer-sales segment. Driven by a database of phone numbers of prospective customers, these switches initiate a call and, as soon as there is

A Clear Vision for Refining the Order Process

Marchon Eyewear Inc. relies on internally designed order-fulfillment software to keep track of its customer base and increase the productivity of its phone representatives

Marchon Eyewear Inc., an eyeglass distributor based in Melville, N.Y., leverages its software investment by extracting data captured in each customer order and turning it into such marketing information as the popularity of certain frames, regional buying patterns, and the number of products ordered and returned in a given time period. This data can be used for test marketing and customer service, as well as in sales reports for field reps and managers.



The software also enables customer-service representatives to get on and off the phone quickly. The company's 65 phone reps take between 6,000 and 8,000 calls per day from ophthalmologists, optometrists and opticians ordering frames. About 99 percent of the calls are orders, and most customers call several times a week, if not several times a day.

"You have to take orders by phone in this business," said Jeff White, co-president of Marchon. "Phone orders are two-thirds of our business because this customer base doesn't keep a lot of stock."

In designing its software, Marchon worked with its customer-service reps so the first screen the rep gets contains answers to the most widely asked questions. "What can get a CSR off the phone fastest?" White said, adding that while there are myriad off-the-shelf telemarketing packages available (see vendor box, Page 69), "most have information you would never need, and the information you would need is never there."

"When you take 6,000 to 8,000 calls a day, saving just 10 seconds per call adds up to tremendous savings," said White. "So we asked our users, 'What questions are asked most? What information do you need most of the time?'"

To shorten the length of calls even more, Marchon last summer installed automatic number identification (ANI) on an AT&T Definity Generic One, a one-way gateway to an IBM AS/400. "When a rep can answer the phone and say, 'Hello, Dr. Jones, how may I help you?' it eliminates the chitchat," White said. "Our phone calls are shorter, and our phone bills are 13 percent lower."

—L. Goff

an answer, transfer the call and the customer's file to the next available operator.

In a best-case scenario, an operator is available to take the call immediately and the consumer is none the wiser. In many cases, however, overly eager companies set their dialers at too fast a rate for the number of operators taking calls, and consumers wind up angry after answering the phone to hear only silence or a recorded message asking them to stay on the line.

When used responsibly, however, predictive dialers can increase a tele-sales staff's hit rate by 100 percent, according to Joseph Porfeli, president and chief executive officer of Electronic Information Systems Inc. (EIS), of Stamford, Conn.

"Consumers aren't home in the daytime, so with manual dialing you usually get 15 to 20 minutes of talk time per hour," Porfeli said. "At night you get about 45 minutes. A predictive dialer can bring your daytime talk time up to the level of your evening talk time."

Above and beyond all the productivity increases and cost decreases these technologies yield, users say their true value derives from the resulting improvement in customer relations.

"If I can make it easier for customers to order from me, they're going to order more from me than [from] my competitors," said Jeff White, co-president of Marchon Eyewear Inc., a distributor of eyeglasses in Melville, N.Y. (see related story, Page 68). The company takes between 6,000 and 8,000 calls a day from ophthalmologists, optometrists and opticians ordering new frames. Using ANI has reduced the time it takes to answer the phone to an average of three seconds and has shaved 12 to 15 seconds off each call.

"These doctors don't want to spend two hours a day on the phone ordering product," White said. "Without this system, we couldn't provide this level of service." 

Leslie Goff is a freelance writer based in New York.

Telemarketing Vendors & Their Products

COMPANY & LOCATION	PRODUCTS
AT&T Business Communications Systems Bridgewater, N.J. 201 658-6000	Definity Communication System includes ACD software, PBX-to-host links and an ISDN gateway. Automated Conversational Telemarketing System is a voice-response system for sales, service and transaction environments. Outbound Call Management System features automated dialing as well as list and operations management. Third-party software
Brock Control Systems Inc. Atlanta, Ga. 800 221-0775	The Brock Activity Manager Series is a set of integrated software modules for marketing, telemarketing, sales-account management and customer service and support.
Coffman Systems Inc. Cerritos, Calif. 800 232-EDGE	Edge TeleBusiness Software System comprises telemarketing-management software for inbound and outbound applications, including scripting, database management, management control and other functions. Edge TeleBusiness Workstation is a personal computer specialized for telemarketing agents; it features a graphical user interface.
Corporate Network Operations (a Hewlett-Packard Co./ Northern Telecom strategic alliance) Santa Clara, Calif. 408 496-5600	HP Advanced Computerized Telephony call-processing server. NT Meridian 1 PBX NT Meridian PBX-to-host link Third-party software
Early, Cloud & Co. Newport, R.I. 401 849-0500	Telephone Delivery Systems are a set of modular software packages for application management and generation, networking data and response queues supporting telemarketing, customer service, account management and electronic response management.
Electronic Information Systems Inc. Stamford, Conn. 203 358-0764	Predictive dialer/ACD
IBM Corp. U.S. Marketing and Services White Plains, N.Y. 914 642-3000	CallPath Services Architecture is a framework for integrating voice and data that supports multiple hosts and switches, including CallPath/400, the PBX-to-host link.
Information Management Associates Inc. Trumbull, Conn. 203 261-4777	Telemar Software includes a set of modular applications supporting marketing, sales, customer service, lead management and voice/data integration.
NPRI Alexandria, Va. 800 526-1984	TeleTech Marketing System is a set of eight interconnected software modules, including ScriptWriter, Information Management Facility, Pen Fulfillment Generator, Telephone Autodial Control, Call Anticipation, RealTime Performance Monitor, Sales Watch and Automatic Report Generator.

Open Windows for EIS

The slick graphical interface of the new Windows version plus its ability to unify multiple data sources add up to good news for EIS vendors and users

BY DAVID FRIEND

Windows 3.0 is poised to change the direction of EIS. The executive information systems market has benefited from numerous developments of late, but Windows overshadows all others. While many people view it as simply an enabling technology—part of the client/server landscape—the advent of Windows is really a seminal, discrete event that is about to have a profound impact on EIS.

What's more, while Windows and LAN servers can now create what might be called a local-area EIS, a quieter revolution is shaping up among the "big iron." Mainframes and minicomputers are being recast as data gatherers, servers and computational engines for wide-area EIS.

Every so often, the information industry experiences a technological development so profound that it upsets all expectations and preconceived notions. These landmarks illu-

minate vast areas of darkness and create excitement, hope and anticipation of great changes to come. The mouse and the color-graphics screen were such breakthroughs. So were creating business graphics from live data on an Apple II, hooking a mainframe and a PC together, and building new kinds of software applications that were previously unknown.

Ironically, such milestones are rarely heralded as great advancements with sweeping implications. The truly seminal innovations tend to make a quieter entrance. They appear modestly as single, finite developments; yet they change forever the way the industry views its products, its services and itself. Windows 3.0 is just a package that sits on the counter at the local Egghead Discount Software store. Unlike some "industry strategy," it can be bought with a credit card and taken home. Yet that simple purchase bends the theoretically straight line of progress and abruptly sends it off in a new direction.

The first hint of the potential power of Windows 3.0 came in early 1989. Back then, we at Pilot Software decided to build an EIS to run under this new operating system—primarily because it offered an appealing, Macintosh-like graphical user interface. Windows looked as if it would be worthwhile, if only because of the graphics quality that had become standard in the Apple world but was still missing from the MS-DOS camp.

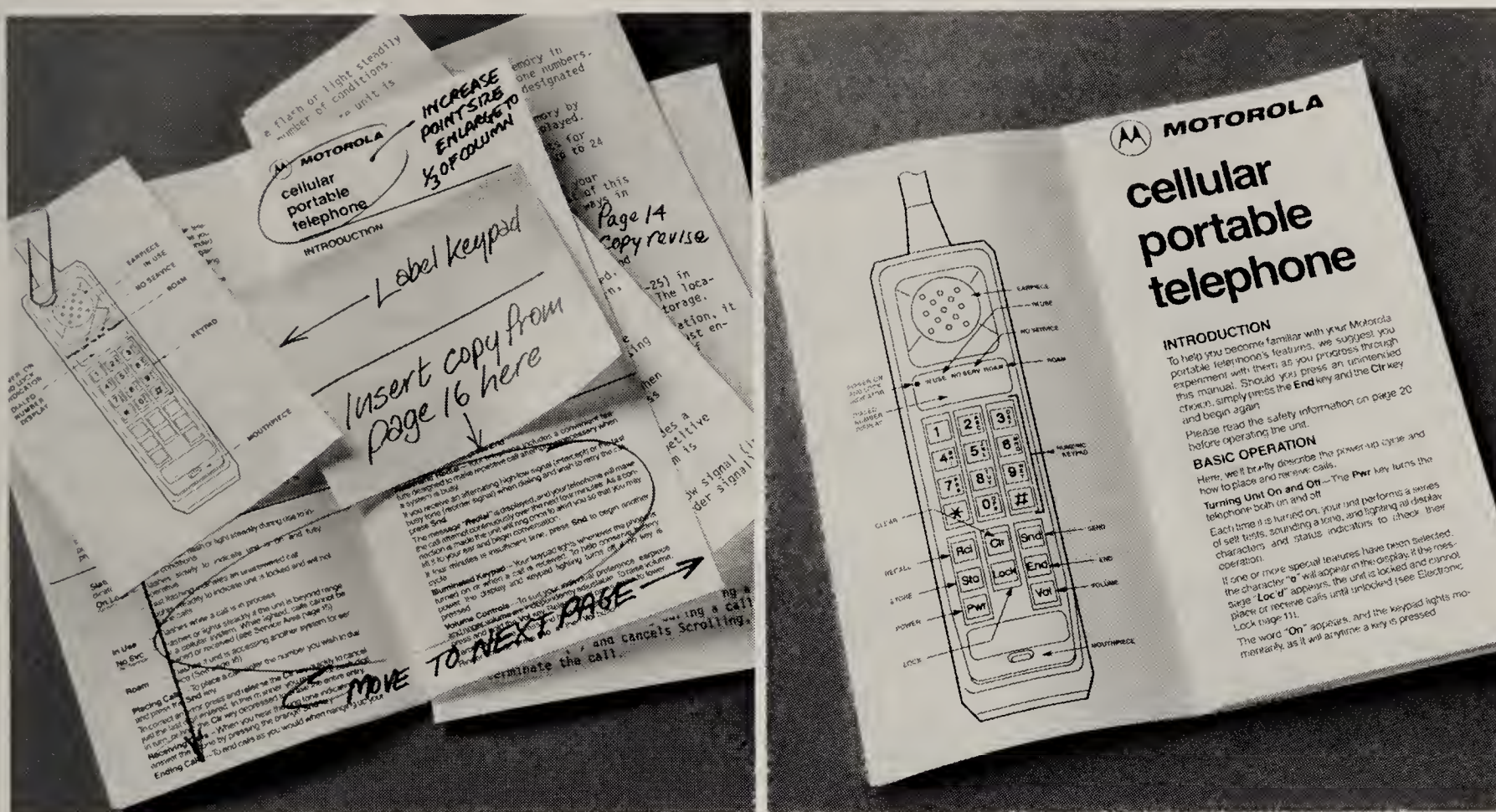
It is now obvious that the graphical component of Windows is not its most important benefit—it's just the frosting on the cake. Windows offers something of far greater importance than three-dimensional buttons or point-and-click operations. It's called Dynamic Data Exchange (DDE).

It's no secret, of course, that the



ILLUSTRATION BY MIKE KLEIN

XEROX



Motorola wrote the book on cellular phones. A Xerox system lets them rewrite it in minutes.

Motorola is the world's largest producer of cellular phones. Not to mention cellular phone manuals. For which they turn to a company called Rich Graphics.

But when Motorola decided they wanted to be able to revise and reprint their manuals on a "just-in-time" production schedule, Rich Graphics turned to Xerox.

Working with Rich Graphics, Xerox developed a solution that integrated both hardware and software, Xerox products and other suppliers' products. And the resulting phone manual production is something to talk about—to say the least.

The manuals are now printed on Xerox laser printers just minutes after the revisions flash across the screen of a

Xerox workstation. Turnaround time is 80% faster. Costs are down 50%. And the documents produced are 99.99966% perfect.

Of course, Motorola isn't the only client that Rich Graphics uses Xerox for. And the resulting improvement in customer satisfaction has helped Rich Graphics *double* their printing business every year since they came to Xerox.

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difficulty of getting software programs to communicate has been one of the biggest obstacles to progress in the industry. DDE embodies a common language that allows the computer to run several programs simultaneously (a spreadsheet and a database, for instance) by letting them "talk" to each other. This means that for the first time in the history of the computer industry, a wide variety of popular commercial applications are available that all conform to a single standard for communicating.

One of the areas where DDE is going to have its greatest impact is in EIS. Essentially, an EIS is an online reporting system that, by definition, must get data from many different sources. Since DDE removes the technical hurdles associated with linking sources of data to an EIS, the work of building an EIS is cut dra-

*Unlike some
"industry strategy,"
[Windows 3.0] can be
bought with a credit
card and taken home.
Yet that simple
purchase bends the
theoretically straight
line of progress and
abruptly sends it off in
a new direction.*

matically. Previously unthinkable projects suddenly look feasible, and difficult and expensive projects start to look simple and cheap.

For example, a DDE-talking Windows EIS can pull data from Lotus spreadsheets, mainframe-based databases, server-based databases, external databases (like news services), image databases (such as maps or

scanned-in photographs), and on and on. In one case, where a user wanted to implement a voice-annotation feature, it took only a couple of hours to locate a vendor of DDE-talking voice-and-controller technology. Three firms at COMDEX exhibited DDE-talking multimedia products for anyone wanting to incorporate live video into an EIS.

DDE processes can also be chained. Take for example, a firm that is building an EIS for its sales department. The firm wants a display that shows actual sales, budget, and percent cumulative variance (year-to-

An EIS must also be able to integrate data from many different sources. Let's say that a company wants to build an EIS for its human resources department that can access text data, a picture, a scanned-in signature and even a voice sample of each employee. First, it would pick a DDE-talking database (Excel, SQL Server or dBASE files, for example), an image database for the photograph and signature, and a DDE-talking voice-board controller. One EIS application could be written for entering data (which would incorporate a video camera for image capture) and an-

What Makes an EIS?

Components of early, current and future EIS toolkits

COMPONENT	ORIGINAL	CURRENT	FUTURE
Relational databases	■	■	■
Character user interface	■		
Graphical user interface	■	■	■
Personal-use tools		■	■
CASE-like development tools		■	■
Direct data pipeline—import and export		■	■
Decision-support tools			■
Text management			■
Image processing			■
SOURCE: INPUT, MOUNTAIN VIEW, CALIF.			

date). If its data is in a Structured Query Language (SQL) database such as SQL Server, it probably would have difficulty computing the cumulative variance using SQL commands. So, rather than getting the data directly out of its SQL server, the firm's EIS could issue a DDE request to a product with computational capabilities, such as Excel, and Excel would in turn issue a request to the SQL database. Excel would compute the variance numbers and return them to the EIS for display. In this manner, different software products can "snap together," so that EIS developers can build applications that look great, work fast and are cheap to install and fun to use.

other for retrieving data.

Because the cost of implementing systems such as these will fall under Windows, more people will be able to take advantage of EIS technology than ever before. In fact, Windows brings the industry one very big step closer to a time when EIS will be synonymous with on-screen access to data of all kinds. As paper-based reporting systems become obsolete, EIS will take up the slack. Windows allows us to take a big step in that direction.

The graphical user interface and cheap MIPS of PCs create an overwhelming incentive to move end-user computing to the worksta-

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Richard McGeary,
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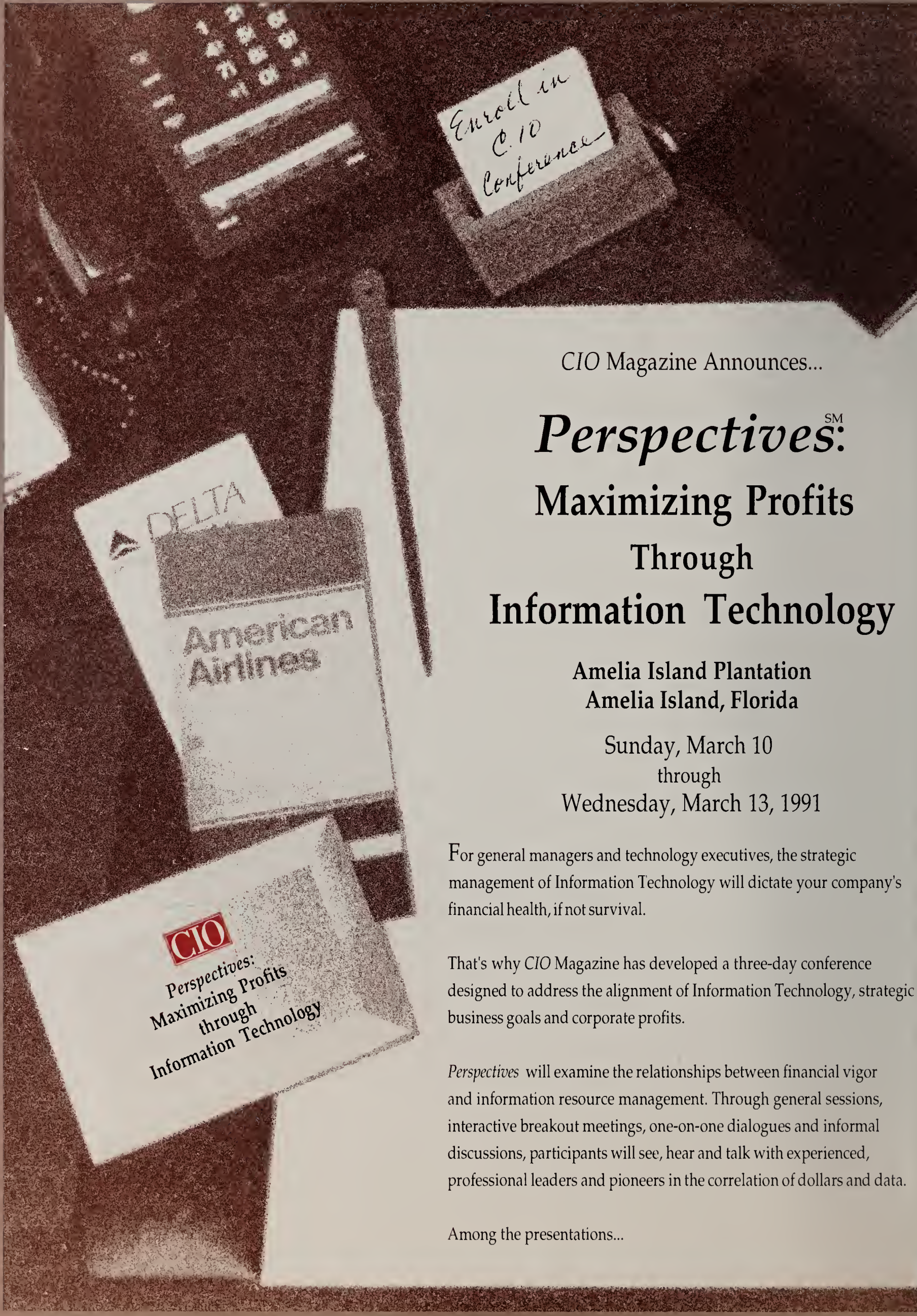
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THE MAGAZINE FOR INFORMATION EXECUTIVES

tion. However, it would be a mistake to think of EIS as just a matter of end-user computing and relegate it to the role of a workstation product. The enabling technology for EIS resides as much in the back-end processes as in the more visible front-end displays.

One of the tenets of distributed database technology holds that data can be distributed around a network and any data is accessible from any node. From the perspective of the EIS builder, this model overlooks one very important practical consideration: speed. An EIS implies not only a high standard of ease of use and data display, but also responsiveness.

Ironically, most people think of mainframes as slow rather than fast. However, when a mainframe is thought of as a server and computation engine rather than as a processor for end-user applications, it clearly can perform certain kinds of queries much faster than an 80386 server. Over the next five years, it is likely that high-powered UNIX-based servers costing upwards of \$100,000 will compete successfully with traditional mainframes for computation-intensive jobs. The point, then, is that an EIS architecture must take into consideration the need for both concentrated, centralized, high-powered processing and distributed, low-cost, low-powered processing.

This is what the client/server model provides. Successful EISs will address the requirements at both ends. Obviously, an EIS that can perform a live data query and deliver the results in five seconds will have a competitive advantage over one that takes 10 seconds to do the same job. That speed advantage is going to come mostly from the back-end software computing engine residing on the server.

The biggest back-end issue is how to store the data in a form that provides for efficient queries. There is no one "right way" to store data. Transaction systems require one kind of data access. An EIS may require a completely different kind of access.

The most important characteristic of an EIS back end is its facility with

It would be a mistake to think of EIS as just a matter of end-user computing and relegate it to the role of a workstation product. The enabling technology for EIS resides as much in the back-end processes as in the more visible front-end displays.

the time dimension of data. One of the fundamental capabilities of nearly any EIS is its ability to display trends. Unfortunately, SQL does not provide an easy way to deal with time-series data; it has no time-series data type.

The disadvantage of this is illustrated by the case of a large financial-services company that recently built an EIS for its fund managers. It wanted a system that would allow the managers to access two years of daily pricing information on approximately 2,000 financial instruments. How could it put this kind of information into an SQL table? It could either set up a table with 500 fields (one for each business day) or use 500 records for each of the 2,000 financial instruments (for a total of one million records).

Since most SQL databases cannot handle 500 fields, the company really had no choice at all. This means that every time a manager accesses a single time series, he or she is retrieving 500 records. Date alignment, conversion of periodicity and other calendaring functions, of course, must be externally coded. All of this can add up to unbearably slow response time and complex maintenance. Such drawbacks make it probable that as online information access through EIS becomes more preva-

lent, serious systems will have to provide time-series database and computational capabilities.

Then there is the issue of where data should reside. In the case of an enterprisewide EIS, some information is shared globally and some is only needed locally. Information that starts on a mainframe (by virtue of the core transaction-processing systems that reside there, such as order entry or inventory control) should not be distributed to individual LAN servers if the data is needed globally or if the data is constantly changing (making any duplication of the data impractical).

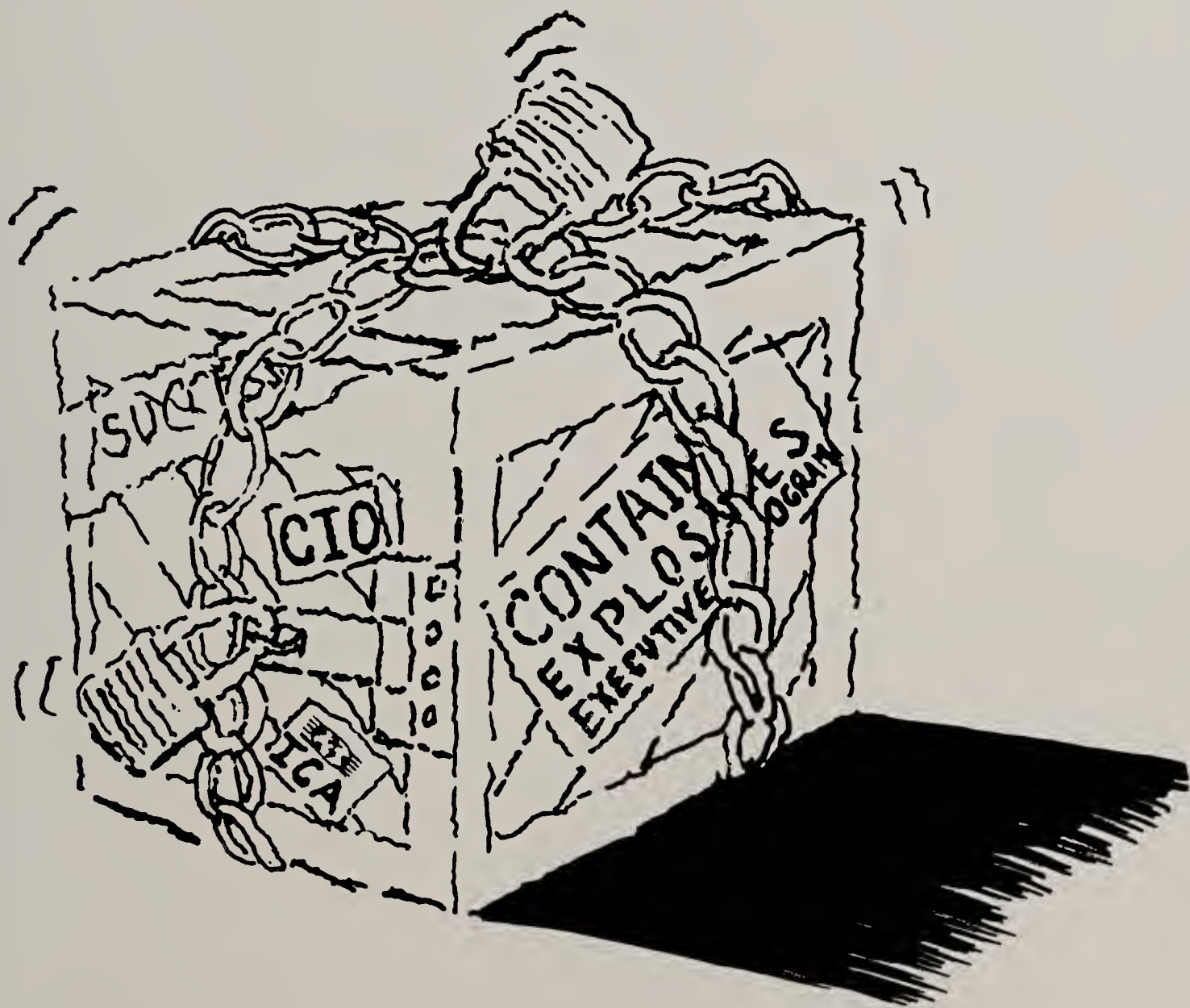
Many companies today have "global" EISs that they built around their mainframes and data communications backbones. Many others have "local" or small departmental EISs that are LAN-based. A complete EIS solution must integrate both of these environments. This will happen when mainframes become specialized servers to all users on the network.

The move is underway from an inventory-based world to a just-in-time-based world. Everything in business is accelerating. The emphasis is changing from global marketing to micromarketing. Businesses are no longer worried about the buying habits of Americans, but about the buying habits of 25- to 30-year-olds residing in specific neighborhoods. The corresponding demand for more detailed information—updated nearly continuously—will rapidly render the old monthly paper-based reporting systems obsolete.

EIS should do for the coming generation of online reporting systems what the fourth-generation-language vendors did for paper-based reports during the last decade. With a PC on nearly every user's desk, with LANs and cheap server processing coming online, and with high-quality graphical interfaces quickly coming of age, the infrastructure for wide-scale proliferation of EIS is now falling into place. 

David Friend is chairman and CEO of Pilot Executive Software in Boston.

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IS Gets a Physical

You can't say your IS function is in tip-top shape until you've given it a thorough checkup

BY N. DEAN MEYER

When asked about the health of their IS functions, many information executives are quick to respond that everything is fine. But is it really?

CIOs are facing a number of paradoxical pressures. They must pull together a far broader range of technologies and disciplines than ever before—not just conventional applications and office systems, but also management science, library science, artificial intelligence, process automation, etc. Yet IS is also expected to integrate the network into a coherent toolkit, particularly difficult in the face of pressures to decentralize the function. On the business side, IS is expected to deliver “strategic value” by entering into a partnership with every aspect of the business to deliver mission-critical systems on an ongoing basis. Yet the clients who form the other half of this partnership remain skeptical about the payoff of IS.

In a general sense, CIOs are expected to innovate while keeping things running efficiently, and to do more with less. Establishing benchmarks for the IS function across a wide range of management and technical issues will enable the CIO to satisfy these often conflicting demands

while building a high-performance staff function.

The purpose of benchmarking is to seek opportunities for improvement by comparing an organization's IS function to an ideal. Companies that perform benchmarking services often assemble bits and pieces from a variety of organizations into a compendium of issues, and describe world-class standards of excellence within each. Benchmarks might fall into the following categories.

Delivering strategic value involves systems that contribute directly to the firm's business objectives and bottom line. Today's organizations cannot operate without IS, but then they cannot operate without janitors either. IS must evolve beyond an operational necessity into a business partner, through continuous contributions to the effectiveness of the organization.

One way IS can gauge its success in delivering strategic value is by examining the perceptions of its clients. The function is succeeding if influential users ask for help with business (not just information) problems; the CIO is a full participant in the executive committee; and top executives are hands-on users of information tools, seeing them as leadership (not administrative) aids.

The implementation methods used by IS are another way to determine whether it is delivering strategic value. A business-driven approach works with selected clients to understand their business missions, key deliverables, and the information used or manipulated to accomplish the deliverables. This process leads to the selection of appropriate tools.

A business-driven approach requires people with an excellent knowledge of business and no technical bias—for instance, a business consultant who is not responsible for



subsets of the IS toolkit. These consultants should be trained in value-added needs assessment, so that their recommendations are defensible and replicable. In addition, IS must provide adequate support for all users who wish to explore a technology-based solution to a business problem. IS should also be decentralized to match the organization as a whole, so that user departments are reasonably self-sufficient. Finally, IS must implement high-value systems actively and frequently.

Ensuring technical excellence focuses on the IS function's ability to deliver excellence in the design and operation of information systems.

To do this, the function must provide efficient, reliable services, including technology-based service bureaus such as the computer center, and people-based services such as a training center.

IS must also implement a broad range of technologies, with excellence in many disciplines. Quality—including modularity, architectural compliance and the delivery of systems complete with documentation and training—must be widely understood and pursued.

Finally, the IS function must engage in effective architecture planning. Guiding technology toward an integrated architecture does not imply top-down systems design, which will lead to technology-driven implementation and a static vision of the future. Rather, architecture planning establishes a set of standards and guidelines. When a system is built for business reasons, it is constructed within the constraints of architecture.

Optimally allocating resources examines how IS resources are apportioned and how the overall level of investment is set. There is never enough of the IS resource to satisfy potential demand, so priorities should be determined solely by payoff and strategic alignment. In addition, the supply of IS services should match the demand.

Effective priorities will not be established when the IS function makes such decisions alone; furthermore, unilateral decisions put the IS executive in the awkward position of having

In a healthy IS function staff members are leading-edge users of information tools.

to say "no" to virtually everyone at one time or another.

Management steering committees are also ineffective: They approve only large, well-understood projects, which often are the least strategic. User executives must play an active role in managing their portfolios so that priorities are set by people close to the business issues.

It is important that supply be sufficient so that the IS function does not forego high-payoff opportunities for lack of resources. Unfortunately, a CIO's request for more funds risks being seen as self-serving and lacking in credibility. Users must procure more resources for IS, since they will benefit from the results. Additionally, an ROI-based filter should limit demand to the available supply.

These economic issues are ideally addressed by a free market for internal services, in which IS functions charge clients and must compete for their share of the internal market for information systems.

Developing the IS human resource requires an effective IS function to develop its personnel assets.

Motivation level, a key indicator of workforce health, is greatly affected by organizational structure and job design. Career paths should be clearly defined for both managers and technical experts. Jobs should include responsibility for producing a whole end product. The reward system should reinforce job objectives and be closely tied to performance.

Motivation is also affected by the tasks employees are given. It can be demoralizing to see outside consultants given responsibility for high-leverage tasks such as user-needs assessments and architecture planning, while insiders are treated as technical drones. Outsourcing should be used to leverage the time

of insiders, not to replace them.

Developing a qualified staff begins with human-resource practices such as hiring and setting compensation. Thereafter, the most powerful way to grow good people is by giving them experience. In a healthy IS function staff members are leading-edge users of information tools.

Professional development should be emphasized; employees must be challenged and then given access to the resources they need to grow. In addition to skills-training, a healthy IS function finds cost-effective ways to bring industry awareness and managerial education to all levels of staff.

Management discipline also is key. Here, control and teamwork are essential. Management control is based on clear accountability for results, and it is enhanced by explicit project-management methods. Teamwork is required because so many projects are multidisciplinary, with experts from a variety of specialties working together. Healthy teamwork depends on establishing clearly who is the prime contractor, and who are the sub-contractors.

Once an IS health audit has diagnosed the problems, managers can start looking for a cure. The CIO can begin forming a plan of action by discussing—both with top executive management and within IS—the above criteria of success and evaluating the current status of the IS function in order to identify areas of concern. Next, he or she must determine which issues are critical, given the IS function's stage of growth. Then, for each issue that is both critical and of concern, the CIO diagnoses the root cause of the problem and identifies corrective actions. Finally, the CIO should sequence corrective measures into an action plan.

The result is a program of specific managerial initiatives that will transform a well-run operational IS shop into a bottom-line contributor worthy of true business partnership. ☐

N. Dean Meyer is founder and president of N. Dean Meyer and Associates Inc. a management-consulting firm in Ridgefield, Conn. A more complete version of these benchmarks is available by calling 203 431-0029.

EVENTS

Strategic Systems Development: From Strategic Planning to Information Systems

Marriott Midtown Suites, Atlanta
January 31-February 1
Greentree Marriott, Pittsburgh
February 4-5
Information Engineering Systems Corp.
703 739-2242

The focus of this conference, featuring Clive Finkelstein, founder and chief scientist of Information Engineering Systems, is strategic systems development and the implementation of the information engineering methodology. Topics include strategic planning, data modeling, process modeling, business unit data modeling strategic development and systems development. Registration fee: \$995.

Information Management Issues Conference

Infomart, Dallas
February 25 & 26
Financial Executives Institute
201 898-4629

The conference will focus on how the CFO and the CIO can work together to make the

most effective use of information in their company. Speakers brief attendees on such topics as major systems trends for the 1990s. Presentations on LANs, CIM, electronic publishing and communications will be given. The keynote speaker will be Paul Allaire, CEO of Xerox Corp. Registration fees: \$475 to \$750.

Bedside Computing in the '90s

Park City Olympia Hotel, Park City, Utah
March 18-20
Society for Clinical Data Management Systems
818 915-5884

This three-day symposium is intended for health-care executives considering making a strategic investment in bedside computer systems. Users and vendors will describe their experiences with the new generation of bedside systems. Topics include advanced alarms, interface design, databases, the medical information bus and scientific visualization. Registration fee: \$378.

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FYI

Talk Is Cheaper

In these belt-tightening times, companies are increasingly looking to their daily communications costs as an area where they should be able to trim some fat. MICOM Communications Corp.'s data/voice network server eliminates toll charges on interoffice phone calls and faxes by putting such traffic onto the companies' private leased lines.

The Marathon 5K combines fast-packet multiplexing with voice and data compression, efficient use of bandwidth and facsimile demodulation to integrate voice, data and fax onto one circuit at rates as low as 9.6Kbps. This is significant, according to the company, since it estimates that 90 percent of the circuits in the U.S. run at 19.2Kbps and below.

In effect, the Marathon 5K offers small and medium-sized companies the advantages previously only available to large corporations through costly T1 lines. A configuration for four data channels and two voice channels with a card for 56Kbps transmission starts at \$6,150. According to the company, this configuration can pay for itself in a year or less. For more information, call 800 642-6687.

The Vision Thing

Companies that believe a picture is worth a thousand data sets will be interested in MapInfo for Windows, from MapInfo Corp. of Troy, N.Y. This desktop mapping software allows users to analyze and manipulate data in picture form across multiple platforms and from most popular data formats, including dBASE and Lotus 1-2-3. Built on MapInfo's relational database engine, the product displays data in maps as well as graphically or in rows and columns. It is designed to support a broad range of applications, from analysis of sales territories and market demographics to environmental planning and vehicle dispatching.

The product was scheduled to ship in December. Suggested retail price is \$995 and includes a selection of ready-made maps. The company also sells maps of the entire U.S., down to the street level. MapInfo Corp. can be reached at 518 274-8673.



Incredible Shrinking Data

IBM PC users can now double the storage capacity of their data-clogged Winchester disks. Stacker, from Stac Electronics of Carlsbad, Calif., doesn't make the disk expand like a wet sponge; instead, it compresses data written to the disk drive and then decompresses the data for reading, processing or printing. All of this occurs in real time and is transparent to the user.

Owners of laptops, notebooks and Micro Channel-based machines can purchase a 30K software version of Stacker that can be loaded into memory using a memory manager utility. For users of IBM PCs, XT's, AT's and compatibles, the product comes in the form of an add-in board that can be installed in minutes—there are no jumpers or switches on the board for users to set.

The suggested retail price is \$229 for the add-in board, \$129 for the software. A third version is available for computer makers to incorporate into their new wares. Stacker is 100-percent compatible with all versions of MS-DOS and PC-DOS 3.x and 4.x, including Compaq's version 3.31. Stac can be reached at 800 522-7822.



Incredible Shrinking PCs

Portable computers have come a long way since the first 33-pound luggable. Panasonic's Office Automation Group offers a pair of notebook-sized machines that sport typical desktop PC features: hard- and floppy-disk drives, optional built-in modems and memory expansion. The CF-170 (\$2,399) tips the scales at 6.1 pounds, while the more powerful CF-270 (\$3,199) weighs 6.9 pounds.

The MC200 (\$1,195) and MC400 (\$1,795) from Psion Inc. are a meager 4.5 pounds; but to get that trim they have unlit screens and use electronic storage instead of disk drives.

Traveling Software's LapLink program, which allows high-speed transfer of files from notebook to desktop PCs, will now come bundled in new machines from AST, Texas Instruments and Samsung. The AST and TI notebook computers will also include Traveling Software's Battery Watch.

For further information, call Panasonic at 800 742-8086, Psion at 203 274-7521 and Traveling Software at 206 483-8088.

CONFERENCE CALL

Question: *What application could your company not live without?*

As information systems have become an integral part of many businesses, computing has moved from behind-the-scenes administration to the front lines of business, where it is often a revenue producer and, in many cases, the glue that holds the company together.

Hy Waxman

Vice president of MIS for Child World/Children's Palace in Avon, Mass.

“I would say that it's our point-of-sale merchandise-replenishment system. By far it's the most important application we have, because it monitors our most important functions. We maintain a perpetual inventory of all our SKUs [stock-keeping units] in the store, and they're inventoried at each individual store. We have 182 stores, so we know what's selling—or not selling, as the case may be—and where.

“By using the sales and sales trends, we forecast future sales, and then we automatically replenish the store using the forecast. For example, as Christmas is coming, the forecasts are automatically implemented, taking into account the increased volume of sales. By January, the system recognizes that sales are not as great as in December, and inventory is adjusted accordingly.

“If we had to do this extent of forecasting manually, the cost would be so prohibitive that we wouldn't do it. We still manually monitor the forecasts of some shipments and make adjustments, but this is

the exception rather than the rule. We do this in cases that are related to other factors besides sales, such as weather conditions or the opening or closing of a store.

“Using this system, we also can reorder automatically from our vendors to replenish our warehouses. So if the stock of Teenage Mutant Ninja Turtles or Monopoly games is low, the system will automatically generate an order from the vendor to the warehouse.”

Paul Taylor

Vice president of information services for International Multifoods in Minneapolis

“We are a \$2 billion multinational company with 15 discretely identified business units in the U.S., Canada and Venezuela, and a corporate headquarters in downtown Minneapolis. Information systems are highly decentralized at Multifoods. Realistically, looking across the company, there are six applications that are really critical.

We're primarily a food manufacturer and a food distributor, and so in that regard the critical applications that we just couldn't get along without are customer order processing (which would include sales analysis and sales tracking), accounts payable, accounts receivable and finished goods inventory. Those applications are critical to our distribution businesses, because they've literally got to be managing their working capital position on an online basis.

“At the corporate level, we

need a very powerful general ledger application. In addition to that, a critical application for our corporate headquarters operations is an integrated personnel/payroll/benefits system. Beyond that, we could identify individual applications business by business; but I think it would be inappropriate to do that, recognizing that we've got 15 business units.”

Dennis Connor

Director of information services for Epic Healthcare Group of Dallas (Epic operates 39 hospitals in several states)

“The one application that is probably the most critical to us in the medical industry is our patient accounting system. When a patient enters a hospital in the admitting area, the system records all the processes and procedures and collects all the billing data. So it goes through the proper procedures and the proper coding for every type of patient, from Medicare to Medicaid, and conforms to government regulations.

“The patient accounting system is almost several systems in one. It allows us to account for the patient; it allows us to bill for the patients and create a receivable. We can do billing in two or three different arenas. We can bill to

the patient as the patient leaves the hospital. Or we can bill to the intermediary—such as Blue Cross/Blue Shield, Medicare or some other independent intermediary—and collect from them, and account for it. So the application helps us to make sure we collect correctly, and insures that we follow the requirements of billing to our intermediaries.

“The application runs on Data General minicomputers in each of our hospitals—or in some cases we have combined two hospitals into one patient accounting system. It's a business-oriented application, and it's right at the source of our revenues: the hospitals. I think every company looks at systems like accounting, general ledger, payables, receivables, that are critical to the business. But our patient accounting system is more of an operational or functional system relating to the money-producing entity of our business, and for that reason I think it's our most critical application.”

Readers are invited to suggest Conference Call questions. Contact Senior Writer Meghan O'Leary at 800 343-4935, ext. 4733, or by fax at 508 872-0618.



AT&T DOESN'T OFFER YOU THESE DATA NETWORKING BENEFITS.

BENEFIT	CYLIX	AT&T
Monthly network performance and data traffic reports	YES	NO
Coordinate installation of all network components including modems, circuits, splitters, etc.	YES	NO
24-hour, 7-day a week toll-free Customer Resource Center to handle all troubles including modems, circuits, etc.	YES	NO
Assistance with front-end protocol	YES	NO
Comprehensive disaster recovery service with telco bypass	YES	NO
Uncomplicated monthly billing for each location on the network	YES	NO
Optimize network configuration regardless of geographic location	YES	NO
Migration to VSAT technology within the same network	YES	NO
Remote location datascope monitoring	YES	NO
Toll free dial back-up service for remotes	YES	NO

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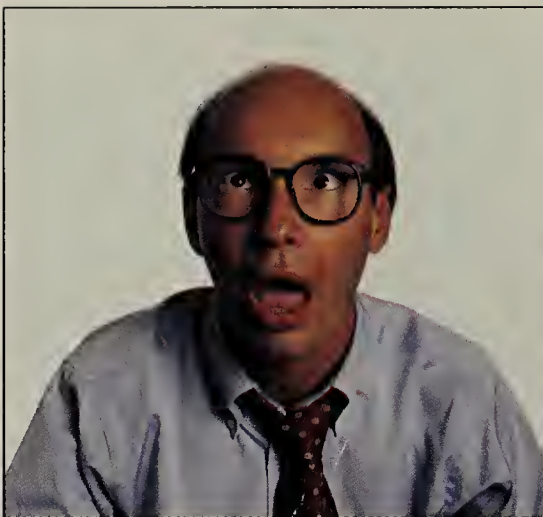
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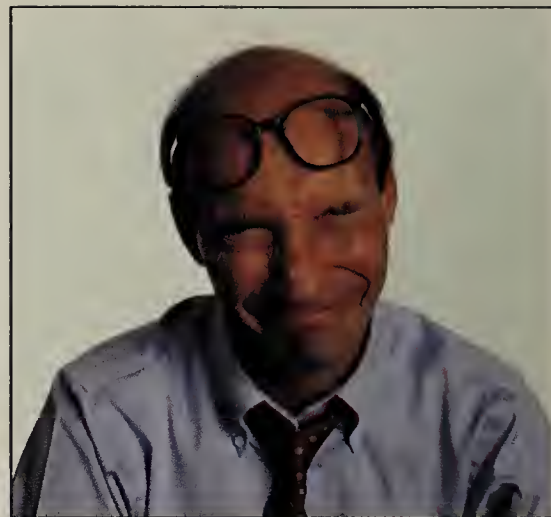
We'll cover your needs one way or another. (Send us your wide area data network configuration. We'll give you an umbrella and a detailed price analysis of your network.)
Dept. C



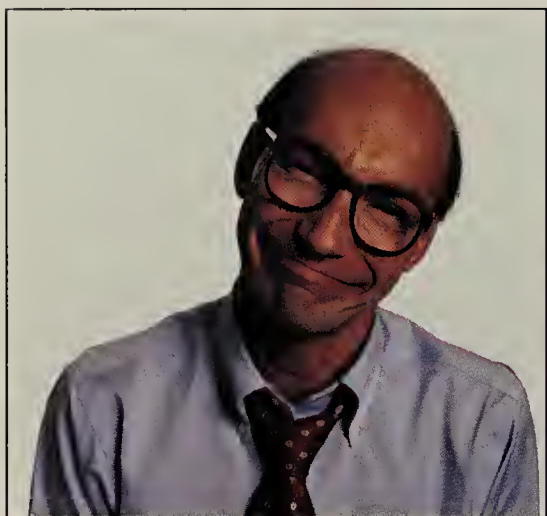
"Hello Mike? What does hard disk failure mean anyway?"



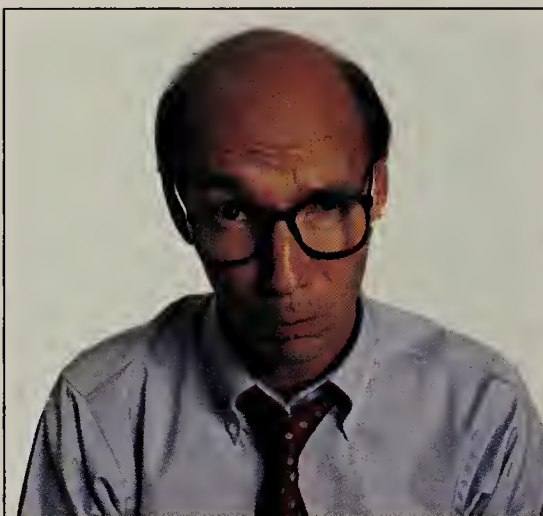
"Mike, we're spending a fortune on these PCs—where is all this money going?!!"



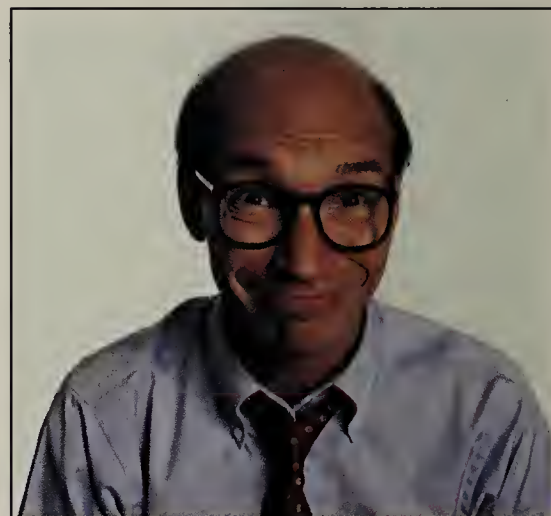
"Hi Mike, can you help me? I can't get on the network."



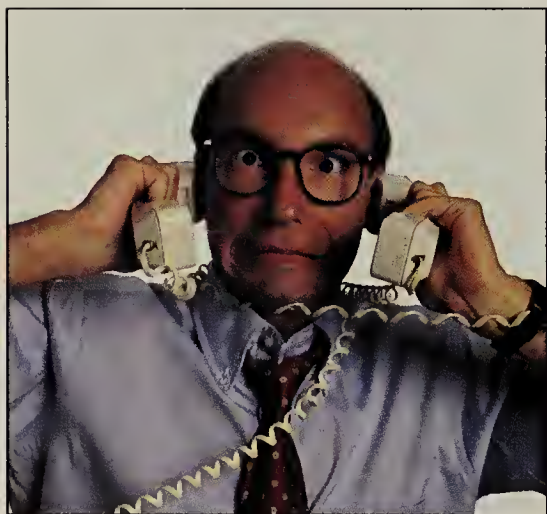
"I have some questions about this DOS stuff. Gotta minute?"



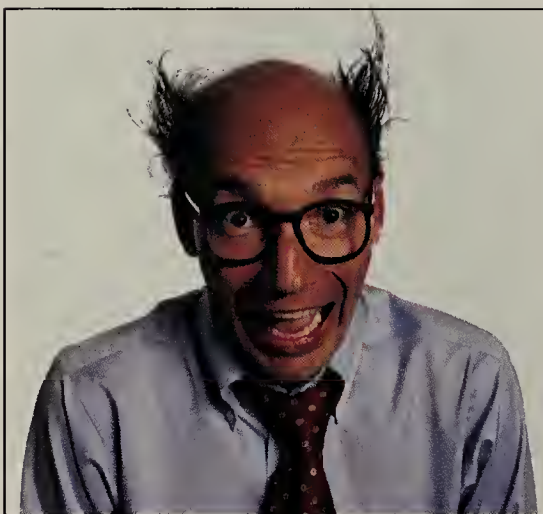
"Quick Mike, I desperately need a color monitor for a big presentation to our CEO!!"



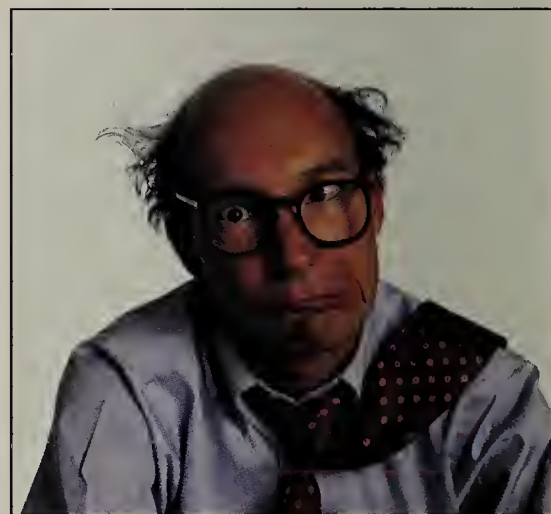
"Hello Mike, sorry, I forgot my password. Again."



"How come they got it and we didn't get it, huh Mike? What's the deal?"



"Mike, I'd like a summary of exactly what you and your people do all day on my desk by noon tomorrow."



"Yo Mike, there's some smoke coming out of the side and this big, loud buzzer noise...Mike? Hello, Mike?!"

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